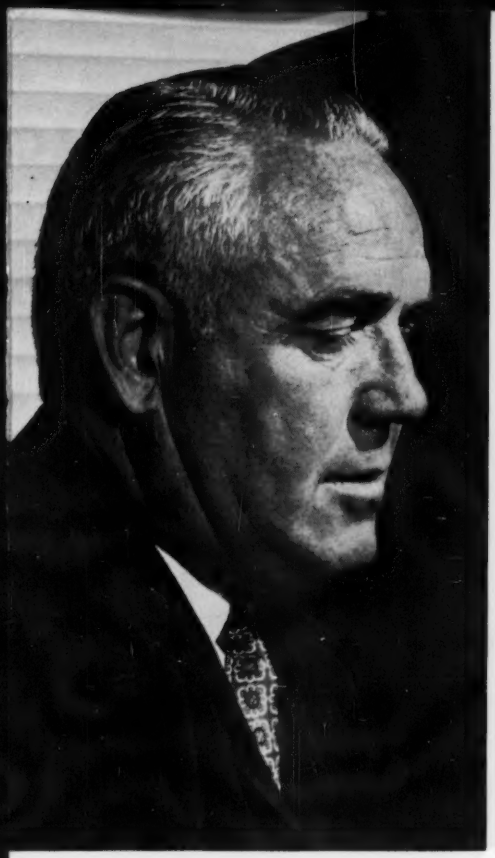

STEEL

The

Metalworking Weekly

MAY 23, 1960

A PENTON PUBLICATION

C. F. BORDEN
Executive Vice President
Kaiser Steel Corp.
Oakland, Calif.

West's Business Gains Momentum

STEEL's air safari editors checking the nation's business pulse find Western metalworkers are weathering the government's cutback in aircraft orders. Sales curves are turning upward, but some soft spots are still present. Mr. Borden's comments: "Kaiser shipped record tonnage in the first quarter. Outlook for the second half is spotty in some markets. But construction and shipbuilding activity are picking up." Other top executives see strength developing in other markets. Imports are affecting the price outlook in some product areas. For a closer look at business activity in nation's most rapidly expanding area, see Page 85

Mitsubishi Won the Contract— But What Did It Really Cost Us?

Big Steel Fires Its Marketing Guns

New Gains in Electron Beam Welding

Wire Rope Sales Hold at 1959 Pace

CONTENTS—TURN PAGE

FOR AVAILABILITY SERVICE QUALITY

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B&W *Job-Matched stainless tubing*

You're assured these important advantages:

- **Availability:** A nationwide network of district sales offices and steel service centers, plus 2 B&W mills—each equipped to serve you promptly from a broad range of tube sizes, grades and finishes.
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These are just a few of the many reasons why it pays to specify B&W Job-Matched Stainless Tubing. And remember—matching tubes to jobs assures you the *right tube,* in the *right quantity,* at the *right time.* For more information call your local B&W District Sales Office, or write for Bulletin TB-410. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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This Week in STEEL
The Metalworking Weekly

May 23, 1960 Vol. 146 No. 21

Sky's the Limit for Metal Buildings

Fabricators of metal buildings may become major steel consumers in the next decade, advises Logan T. Johnston, president of Armco Steel Corp. They took only a few thousand tons of steel in 1939, 500,000 tons last year. Although acceptance is lagging in housing markets, metal building construction is already a $1 billion industry, with dollar volume climbing 25 per cent a year. PAGE 88

Mitsubishi Contract—What Did It Really Cost Us?

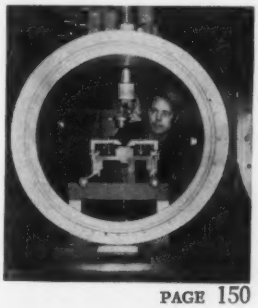
Plymouth Locomotive Works, a division of Fate-Root-Heath Co., and the only industry in Plymouth, Ohio, lost its government bid on 39 locomotives and three cranes. The winner: Japan's Mitsubishi Kaisha Ltd. The repercussions have been great. For the details, from Plymouth and Washington, turn to PAGE 90

Big Steel Mans Its Marketing Guns

Answering the challenge of nonferrous materials, the nation's biggest steelmaker is launching an application research and marketing program aimed at winning consumers and designers to steel. The method: Helping customers redesign their products to cut costs, reduce weight, and make the most effective use of newer and stronger steels. Last week, Austin J. Paddock, president of U. S. Steel's American Bridge Div., challenged one of steel's biggest customers, the automakers, to make better use of today's steels. Here's how the sales tools are developing. PAGE 95

New Gains in Electron Beam Welding

The process is midway between the laboratory and production stages, says Sciaky Bros. Inc., Chicago. Advantages include: Nonmetallic inclusions with a lower melting point than the base metal are vaporized and removed; the weld is usually more ductile than the parent metal; joints are said to be stronger than those produced with the conventional fusion welding processes and better able to distribute stresses through ductility. Here, an operator examines a buttweld fixture with horizontal movement.



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Wire Rope Sales Hold at 1959 Pace

Watch for production and sales of wire rope and cable to climb with the advent of spring weather and stepped-up construction activity. STEEL's market survey shows rope and cable makers expect volume to at least match last year's business; an increase of 8 to 10 per cent is possible. Current stable prices are threatened by cuts resulting from too much capacity and low price imports. PAGE 173

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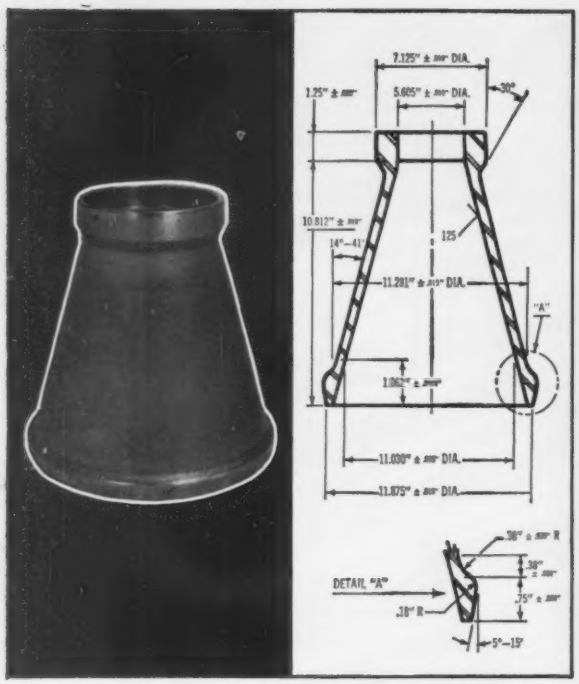
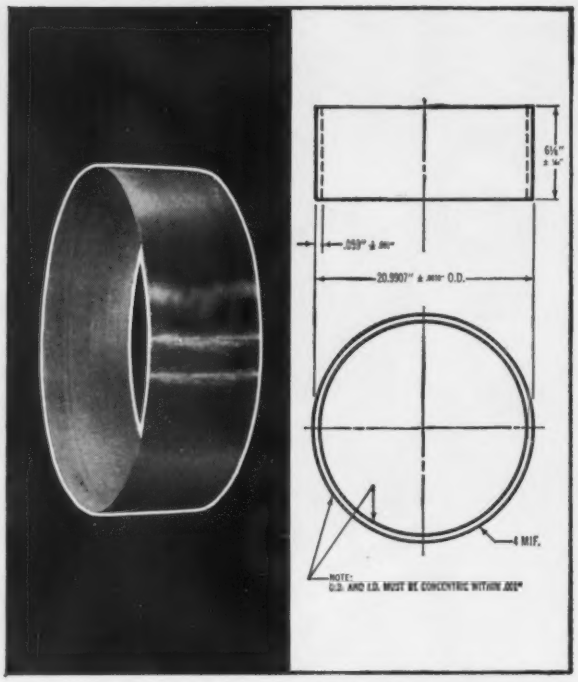


STRAIGHT SIDE ROCKET CONE—Spun with tapered wall from 1020 steel blank: 18" diameter, 1" thick. Inside surface 125 MIF.



STRAIGHT WALL TUBE PRINTING BAND—Spun from ⅛" thick aluminum to .060" wall thickness, outside surface machine finished to 4MIF.

ROTOFORMS open new

ROTOFORMING reduces cost of unusual metal shapes—saves metal, eliminates machining and surface finishing

The design possibilities for hollow metal shapes are now unlimited. The most unusual metal custom parts can be practically and economically produced by ROTOFORMING.

This revolutionary new metal forming service now being offered by COMMERCIAL SHEARING & STAMPING displaces metal in a blank or preform. Rollers contacting the outside surface of the metal form it by high pressure as it rotates around a mandrel. The shape of the mandrel itself, at all times, controls the inside contour and size of the part.

WHAT SHAPES ARE POSSIBLE? Basically, ROTOFORMS can be grouped into four main categories: Straight-Side Cones, Straight-Wall Tubes, Curvilinear-Wall Shapes, and Elliptical or Hemispherical Shapes. Pictured above are representative ROTOFORMS already produced by COMMERCIAL. Principal dimensions are included.

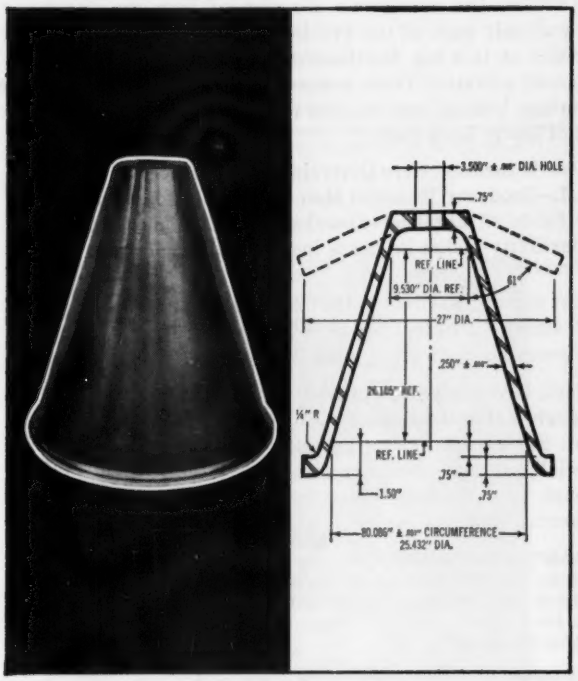
WHAT ABOUT SIZE AND WALL THICKNESS? The range of sizes for ROTOFORMS covers maximum diameters up to 42" down to a minimum tube I.D. of 2¼". Tube length can go as high as 100".

Steel blanks up to ¾" thick can be successfully handled by ROTOFORMING where conical shapes are involved. And when it comes to forming straight-wall tubes the wall thickness of steel blanks can even go up to ⅝". When forming metals more ductile than steel it is possible to work blanks with even greater wall thicknesses than those above.

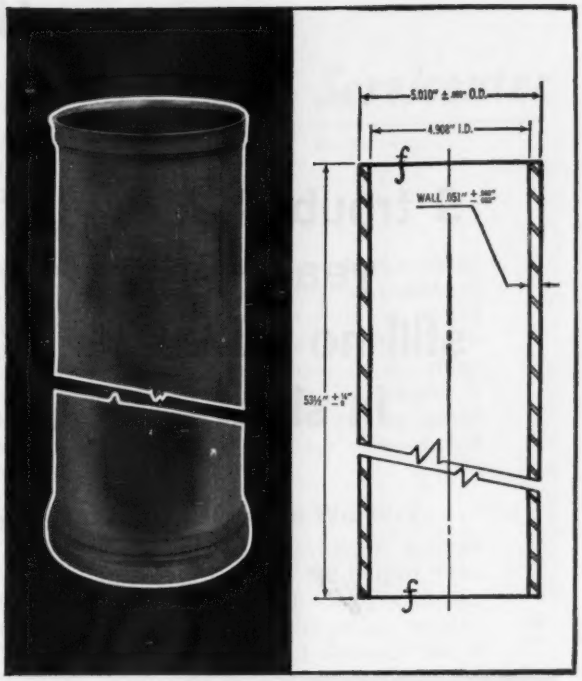
With ROTOFORMS wall thicknesses—both constant and variable—are feasible. Walls referenced to C/L can be straight, curved, or tapered. And ROTOFORMS have been successfully produced with a finished wall thickness no greater than 1/32".

WHAT METALS CAN BE ROTOFORMED? A wide variety of carbon steels, stainless and special alloy steels, as well as aluminum, nickel, copper, molybdenum, magnesium and titanium alloys can be successfully ROTOFORMED. Even metal alloys such as 4130 steel, 1100-0 aluminum, and hard to machine Hastelloy, can and are being used in the regular production of ROTOFORMS.

WHAT HAPPENS TO THE METAL? The plastic deformation which metals undergo in the ROTOFORMING process elongates their grain structure and sub-



STRAIGHT SIDE MISSILE EXIT CONE—Spun with constant wall thickness from press pre-formed 1040 steel blank: 29" diameter, ¾" thick.



STRAIGHT WALL ROCKET TUBE—Spun from 4135 steel tubing (wall thickness ½") reduced to finished wall .051".

horizons for metal shape design!

stantially increases their strength. Tensile increases 1½ to 2 times, yield point is raised in even higher proportion, and fatigue strength is substantially improved. And ROTOFORMED parts can be heat treated to increase their ductility.

Because of the plastic deformation of metal, involved weld joints become unnoticeable when ROTOFORMED. And there are no hidden metal flaws in ROTOFORMS. Any metal inclusions or flaws in the parent metal are quickly uncovered during the ROTOFORMING process—appear as ruptures when pressure spinning rolls reposition the metal by physical displacement. Only 100% sound metal will produce successful ROTOFORMS.

WHAT ABOUT TOLERANCES AND FINISHES? Extremely close tolerances and tolerances commonly associated with fine machining are routine in the production of ROTOFORMS. It is not uncommon for ROTOFORMED parts taken from the machine as is to have inside diameters held to tolerances of +.000" −.003", +.005" −.000", and +.005" −.005".

Inside areas of ROTOFORMS finish to a glass-like surface—30 to 60 micro inch finishes being well within standard production practice. While outside surfaces finish to about 125 micro inch.

Because dimensional tolerances and inside surface finish have a direct relation to the variation and finish of blank from which the ROTOFORM is produced, when necessary the tolerances of a blank can be reduced and its finish improved beforehand in order to provide closer tolerances and a better inside finish in the actual ROTOFORM. In addition, the outside surfaces of ROTOFORMS can be brought to smoother finish by grinding, polishing or fine machining.

AN INVITATION FROM COMMERCIAL! This new metal forming process could be the practical and economical answer to your particular component problem. You can find out very quickly. Just a blueprint, sketch or prototype of your part in the hands of our engineers will bring you the complete cost-saving story—and at no obligation. Address inquiries to Commercial Shearing & Stamping Co., Dept. L-22 Youngstown 1, Ohio.

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9 trouble-free years— still no trouble in sight

HANDLING the murderous abrasion of iron-ore slurry was only part of the problem when they added new facilities at this big Northeastern mine. There was also incessant vibration from pumps and refiners—certain to encourage leakage and shorten the life of just about any kind of slurry lines used.

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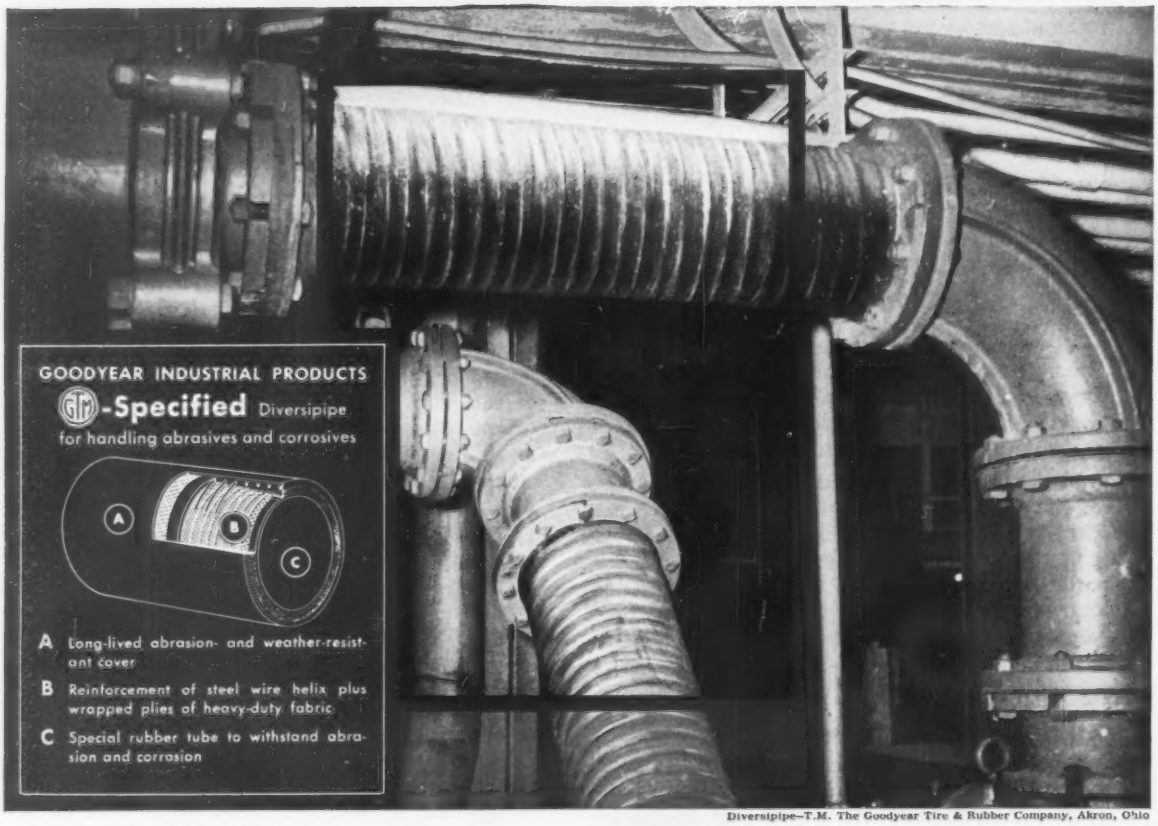
In fact, Diversipipe has proved the moneysaving answer to tough material-handling problems like this in many a plant. For expert tips on handling pumpable materials—especially abrasives or corrosives—check with the G.T.M. through your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*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DIVERSIPIPE BY

GOODYEAR

THE GREATEST NAME IN RUBBER

Our March Usership Winner . . .

. . . Loren W. Smith (left) receives a check for $500 and a Usership plaque from Associate Managing Editor John Morgan.

Mr. Smith is assistant vice president, Metallurgical Development, Symington-Gould Co., a division of Symington Wayne Corp., Depew, N. Y.

He used the "Progress in Steelmaking" article in the Mar. 7 issue of STEEL which reported on pressure pouring of steel billets at Griffin Wheel Co., Chicago, a subsidiary of American Steel Foundries, and U. S. Steel Corp.'s South Works, Chicago.

His Idea

"My use of the article: A proposal that our company develop a technique to cast steel billets. While our foundry products are railway steel castings, a diversification product with good market appeal, such as cast steel billets, would broaden our plant's operation. The article assures my management that development work in permanent molding of cast steel can be fruitful.

"My idea: Gravity pour billets in a metal mold that is set up for controlled metal placement and adequate progressive cooling. The graphite mold used in the Griffin process requires a pressure pouring technique for getting steel into the mold, mainly to preserve the life of the mold. Since we do not have this type pressure pouring equipment, we wish to achieve metal placement in a split metal mold, using a hollow pour tube inside the mold. (Sketch enclosed.)

"Timing withdrawal of the tube with the rise of the poured metal on top of the solidifying casting requires good correlation. This can be done by an electronic-servo mechanism. A split cooling coil will deliver cool dry air to the outside of the mold. It will rise in step with the poured metal. Controlled progressive solidification is achieved with a hot molten head on the rising metal level throughout the pouring period. It is anticipated that the split mold can be opened within a short period, the hot bar removed, and the process repeated . . ."

Five Honorable Mention Winners . . .

. . . picked up engraved desk lighters as their awards. Here are their names: Bill Burgett, Wire Mill foreman, Republic Steel Corp., Gadsden, Ala.; Bruno F. Darin, senior engineer, Aerojet-General Corp., a subsidiary of General Tire & Rubber Co., Sacramento, Calif.; William W. Gallagher Jr., manager, Buff & Buff Mfg. Co., Jamaica Plain, Mass.; Edward Mello, chief engineer, Merriman Bros. Inc., Boston, Mass.; and one entrant from Illinois who wishes to remain anonymous. He submitted an entry that he also used in his company's suggestion system. Disclosure of the problem and his solution might embarass his employer.

You Can Win $1000 This Month . . .

. . . in STEEL's Usership Idea of the Month Contest. Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—May, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . You will win an additional $500 if you furnish proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Please identify letters as Usership entries—

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Call your local Industrial Distributor. He has the full cooperation of our Engineering Department.

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HOLYOKE MASSACHUSETTS

They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. Deadline for this month's contest is July 1, 1960.

Impact!

Seldom has any editorial matter created such a reaction . . . that's what they're saying about Editor Walt Campbell's testimony on the impact of foreign competition given before the House Appropriations Subcommittee on Foreign Operations. (STEEL, May 2.) Within one week, requests for 20,000 copies had been processed by our Reprint Department.

Walt also presented a portion of his testimony on the 140-station Manion Forum radio network, May 22. His 15-minute talk reached between 6 million and 8 million people in 40 states.

That interest surge underscores the fact that foreign competition poses one of the gravest problems confronting today's industry. To help you meet it, STEEL's editors have hoisted the battle flags of Production and Materials Efficiency, the themes of our 1960 Program for Management. The 26-part program explores many of the several ways managements can offset the competitive effects of wage differentials between domestic and foreign companies. The keystone: Lowering costs through better management. The eleventh installment appears next week. Its title:

How to Pick a Vender

In an extensive survey of metalworking, Editors Bob Huber and George Howick found out what purchasing practices are popular in the industry. They also conducted numerous interviews that will help you put more science in vender selection.

To increase your production efficiency, check the article next week.

Beating the Experts . . .

. . . can be fun and you could win two weeks behind the wheel of any Ford Div. car of your choosing. That's the prize for the best guesser in our 1960 Beat - the - Experts contest. The five next best guessers will collect full color prints of a dream car designed for the contest by Virgil M. Exner, Chrysler Corp. vice president and director of styling. If you're detail minded, read the rules in the May 16 Servicenter, Page 5—otherwise, enter your guesstimate of U. S. passenger car production for 1960 on the coupon in this column, complete the blanks, and send the coupon today.

One of the toughest jobs facing any executive group is ***PRE-PRODUCTION PLANNING.*** You've got to keep pace with technology—weigh costs—standardize quality—anticipate profits. And you've got to do all these things before production begins!

It pays to look at the special metals being processed at Wolverine Tube, Division of Calumet & Hecla, Inc.

BEFORE YOU DECIDE!

In process work, such metals as zirconium, columbium, titanium, tantalum, molybdenum and nickel alloys can be of major importance.

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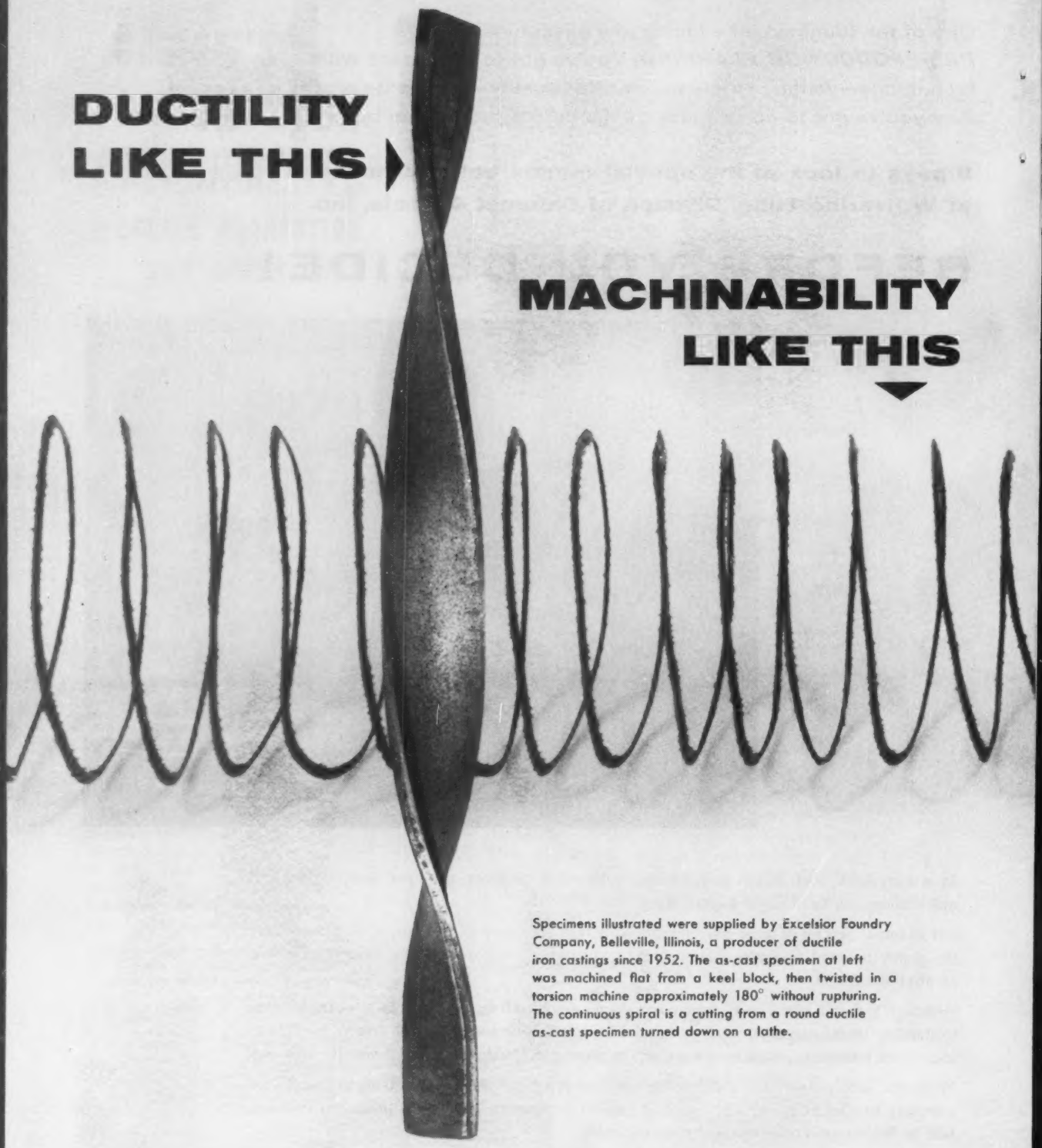
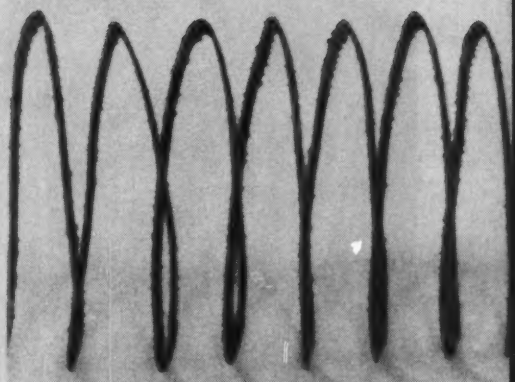


Specimens illustrated were supplied by Excelsior Foundry Company, Belleville, Illinois, a producer of ductile iron castings since 1952. The as-cast specimen at left was machined flat from a keel block, then twisted in a torsion machine approximately 180° without rupturing. The continuous spiral is a cutting from a round ductile as-cast specimen turned down on a lathe.

. . . when Chateaugay Pig Iron is the base metal in ductile iron castings



The finest spheroidal graphite or ductile types of cast iron possess many of the engineering advantages of steel—ductility, high strength, toughness, machinability, heat- and wear-resistance—when they are produced with Chateaugay Pig Iron.

High total carbon and unusually low manganese, phosphorus, and sulphur content suit Chateaugay perfectly for production of high ductility as-cast grades of ductile iron.

Chateaugay's consistently uniform chemical analysis is an important factor in achieving as-cast properties, especially ductility. Freedom from excessive amounts of subversive elements assures the formation of graphite nodules. Additionally, the inherently excellent properties of Chateaugay Pig Iron are maintained in the ductile form.

Castings produced with Chateaugay are of consistently high quality with close grain and uniform structure. And, because it can be cast without excessive shrinkage, adjoining light and heavy sections are filled completely. This assures strong, flaw-free castings accurate to patterns and shapes.

To assist you in using Chateaugay to best advantage, Republic provides a complete foundry engineering service covering all phases of foundry operation—metallurgical, molding practice, gating, risering, and cupola practice. Contact your Republic representative, or mail the coupon for prompt service.

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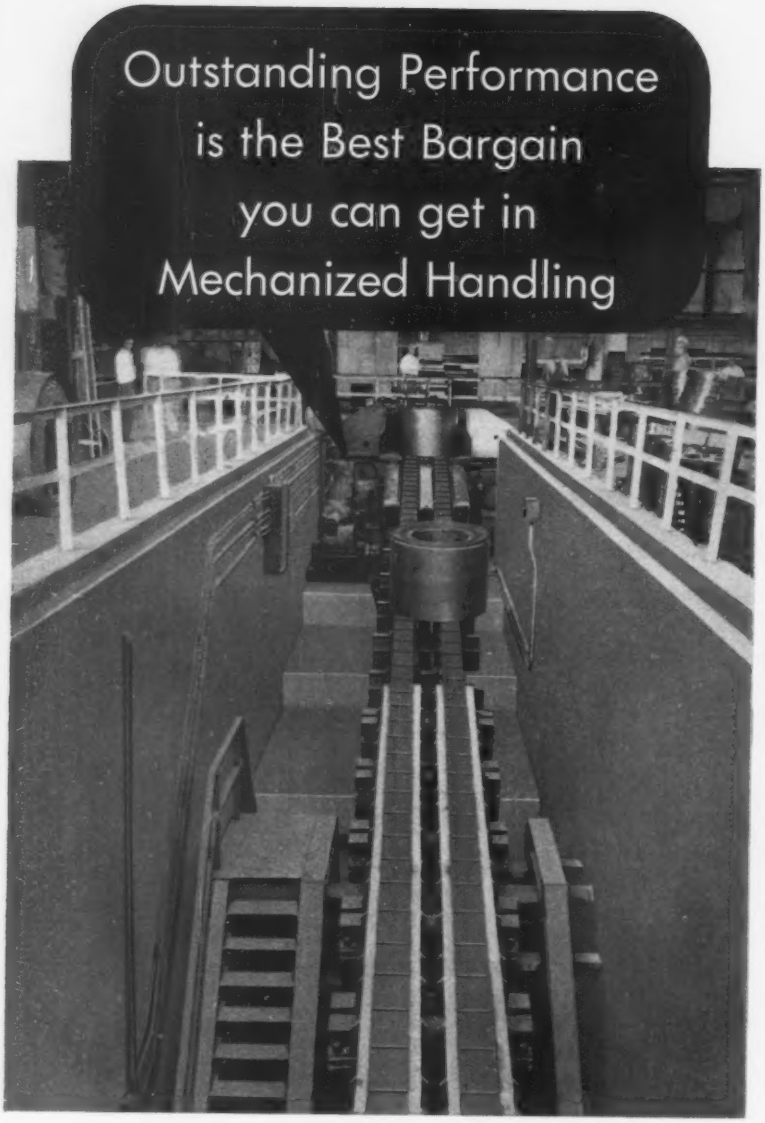

• Many plant operating people responsible for specifying conveying systems today are demanding equipment that is right *for them*—that will fully meet *their* individual requirements—that is built to operate under severe service. They are looking beyond the price—to design and quality.

Mathews Engineers are giving these people a complete conveyer service — from the first proposal through installation—and equipment that is delivering outstanding performance in the metalworking industries.

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Over fifty Years of Leadership in Mechanized Handling

MATHEWS

CALENDAR
OF MEETINGS

May 23-25, Triple Industrial Supply Convention: Conrad Hilton Hotel, Chicago. Information: W. B. Thomas, Thomas Associates, Keith Bldg., Cleveland 15, Ohio.

May 23-26, American Society of Mechanical Engineers: Design engineering conference and show, Statler-Hilton Hotel, New York. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

May 24-26, American Society for Quality Control: Annual meeting and exhibit, Sheraton-Palace Hotel, San Francisco. Society's address: 161 W. Wisconsin Ave., Milwaukee 3, Wis. Administrative secretary: W. P. Youngclaus Jr.

May 25-26, American Iron & Steel Institute: Annual Membership meeting, Waldorf-Astoria Hotel, New York. Institute's address: 150 E. 42nd St., New York 17, N. Y. Secretary: George S. Rose.

May 30-31, Wire Reinforcement Institute Inc.: Spring meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 1049 National Press Bldg., Washington 4, D. C. Managing director: Frank B. Brown.

May 30-June 4, Concrete Reinforcing Steel Institute: Annual meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Institute's address: 38 S. Dearborn St., Chicago 3, Ill. Managing director: H. C. Delbell.

June 1-4, Automotive Engine Rebuilders Association: Annual meeting, Netherland-Hilton Hotel, Cincinnati. Association's address: 901 Roosevelt Bldg., Indianapolis 4, Ind. Executive vice president: James H. Templin.

June 5-9, American Society of Mechanical Engineers: Semiannual meeting and aviation conference, Statler-Hilton Hotel, Dallas. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

June 5-9, Association of Industrial Advertisers: Annual meeting and exhibit, Shoreham Hotel, Washington. Association's address: 271 Madison Ave., New York 16, N. Y. President: John C. Freeman.

June 5-10, Society of Automotive Engineers Inc.: Summer meeting, Edgewater Beach Hotel, Chicago. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

June 6-8, Malleable Founders' Society: Annual meeting, Elbow Beach Surf Club, Hamilton, Bermuda. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Better products through better methods and steels

(or how zinc-coated steel cut 5 steps from auto lamp housing fabrication). When automotive head and tail lamp housings were drawn from cold rolled sheet steel and then zinc-plated or painted, as many as five or six handling and cleaning steps were required to make them corrosion-resistant. Now, fabricated from Weirkote continuous-process zinc-coated steel, the housings go directly from the press to the assembly line. Further processing is unnecessary because Weirkote can be worked to the limits of the steel itself without chipping or flaking its corrosion-resistant zinc surface. It's this superiority that caused the automobile industry to increase its consumption of zinc-coated steel more than 700% in five years; to use it in such varied applications as mufflers, window channels and the understructures of unitized bodies; to take

advantage of developments such as differentially zinc-coated steel that can be welded at top production-line speeds. A major supplier is Weirton Steel Company—producer of Weirkote continuous-process zinc-coated steel and many other fine steels that improve products, methods and profits throughout industry.

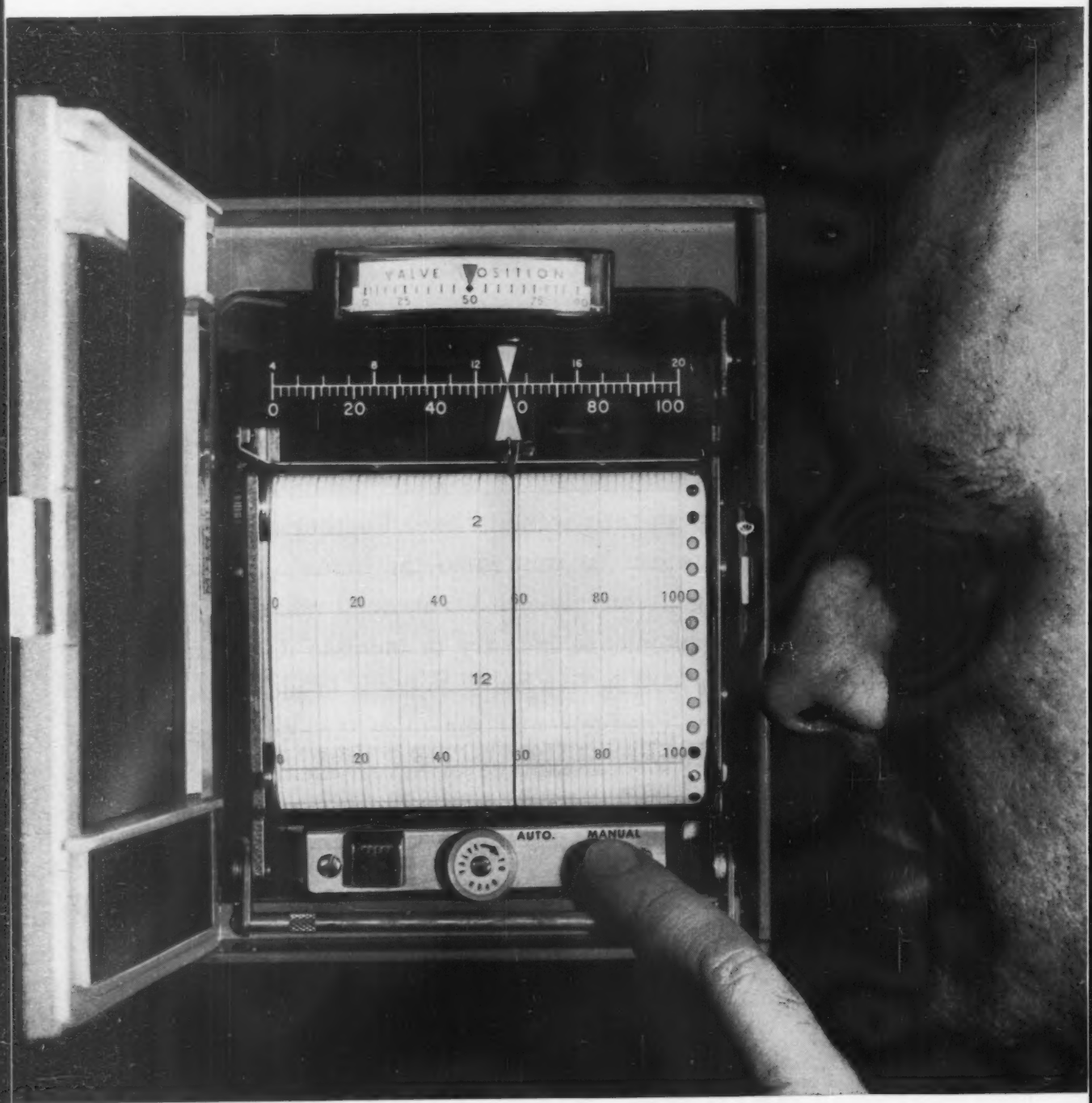
WEIRTON STEEL
Weirton, West Virginia

WEIRTON STEEL COMPANY

Weirton Steel is a division of **NATIONAL STEEL CORPORATION**

Weirkote will also be available in 1961 from National's Midwest Steel Division, Portage, Indiana.

New *ElectriK Tel-O-Set*... needs in a single compact



everything an operator control station

This Honeywell electric control station meets all of your requirements for operator convenience.

One compact case houses *every* function the operator needs to supervise a control loop: indication of process variable and set point on the same scale; the controls needed to switch from automatic to manual; controls for manual control; and indication of valve position.

The *ElectriK Tel-O-Set* control station assures easier bumpless transfer than ever before available because there's no need to "line up" or "match" pointers. A null balance indicator eliminates guesswork, and the transfer doesn't have to be hurried since the valve remains under control during the transfer.

You can also order the controller with the proportional band, rate, and reset adjustments on the front of the panel conveniently located below the control station, or at the rear of the panel.

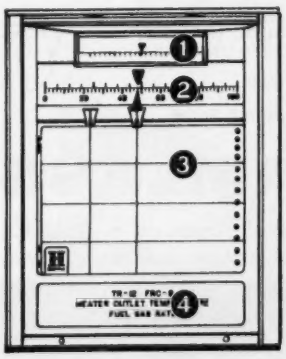
These are just a few of the features that make the new *ElectriK Tel-O-Set* control system an outstanding value. Your Honeywell engineer can give you complete details. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL, Fall River, Massachusetts.

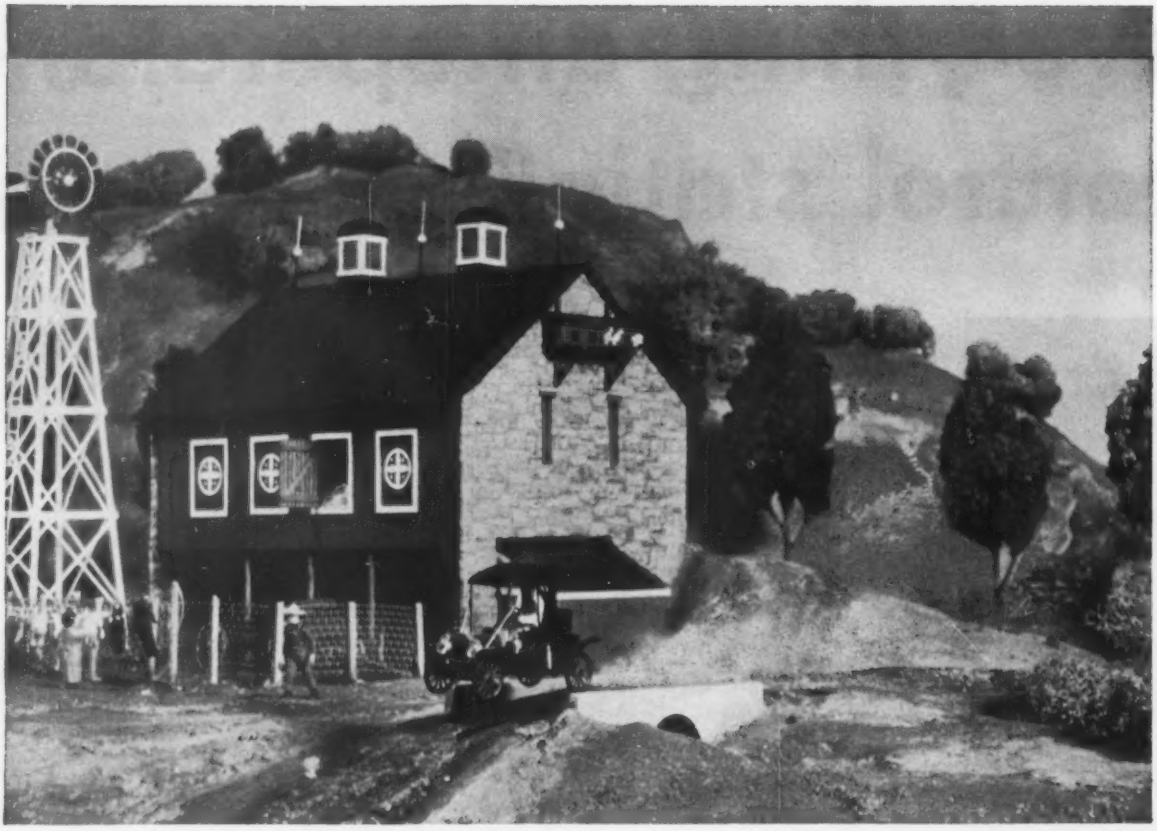
75th YEAR
PIONEERING THE FUTURE

Honeywell

H HONEYWELL *First in Control* SINCE 1885



1. Valve position indicator continuously indicates controller output when on automatic control.
2. Set point index is conveniently located on same scale as process-variable pointer; you can see from a distance any deviation of variable from set point.
3. Rectilinear 4-inch calibrated chart is easy to read. At standard chart speed, four hours of recording is always visible. Unit has daily chart tear off or 30-day rewind. Both recorder and control station take the same 5½" x 6" panel cutout.
4. You get bumpless switching from automatic to manual control because you don't have to match pointers. In the balance position, the valve position indicator is part of a null circuit that compares controller output and manual output. When indicator reads 50%, both outputs are perfectly matched.



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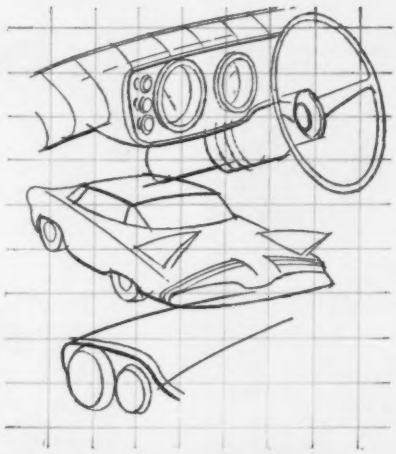
OSTUCO tubing is the exact tubing you need for your product because OSTUCO Tubing is CUSTOM MADE for your product. Your order is manufactured to your own specifications to produce steel tubing especially for your application—the precise grade, analysis, size, shape, special anneal and tolerances best suited to your own needs.

Ohio Seamless Tube produces both seamless and electric welded steel tubing—is prepared to form many finished or semi-finished tubular parts to your designs.

To get the most from your next steel tubing order, use Custom Made OSTUCO TUBING. Contact your nearest Ohio Seamless representative, or send part drawings to the plant at Shelby, Ohio—Birthplace of the Seamless Steel Tube Industry in America.



A-2185A

Model illustrated built to 3.5 mm scale.

SEE US AT BOOTH 629—DESIGN ENGINEERING SHOW MAY 23-26

OSTUCO SHELBY, OHIO

OHIO SEAMLESS TUBE

Division of Copperweld Steel Company • SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • *Fabricating and Forging*

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Exclusive features of Landis Universals shorten setup time . . . lower costs on grinding small parts

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Landis 10" x 20" and 10" x 24" Universal Grinders for toolroom or short runs where parts require high precision and fine finishes.

Exclusive eye-level *wheel feed* for easier operation, less chance for errors, quicker setup.

Exclusive swing-type internal grinding fixture with belt guard. Fixture does not interfere with operator when locked in raised position.

LANDIS

precision grinders

LANDIS TOOL COMPANY / WAYNESBORO, PENNA.

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- Executives will weigh this mandatory tax reduction program in their future plans.
- Top Income Tax bracket will be reduced 50%, graduated over a six-year period.
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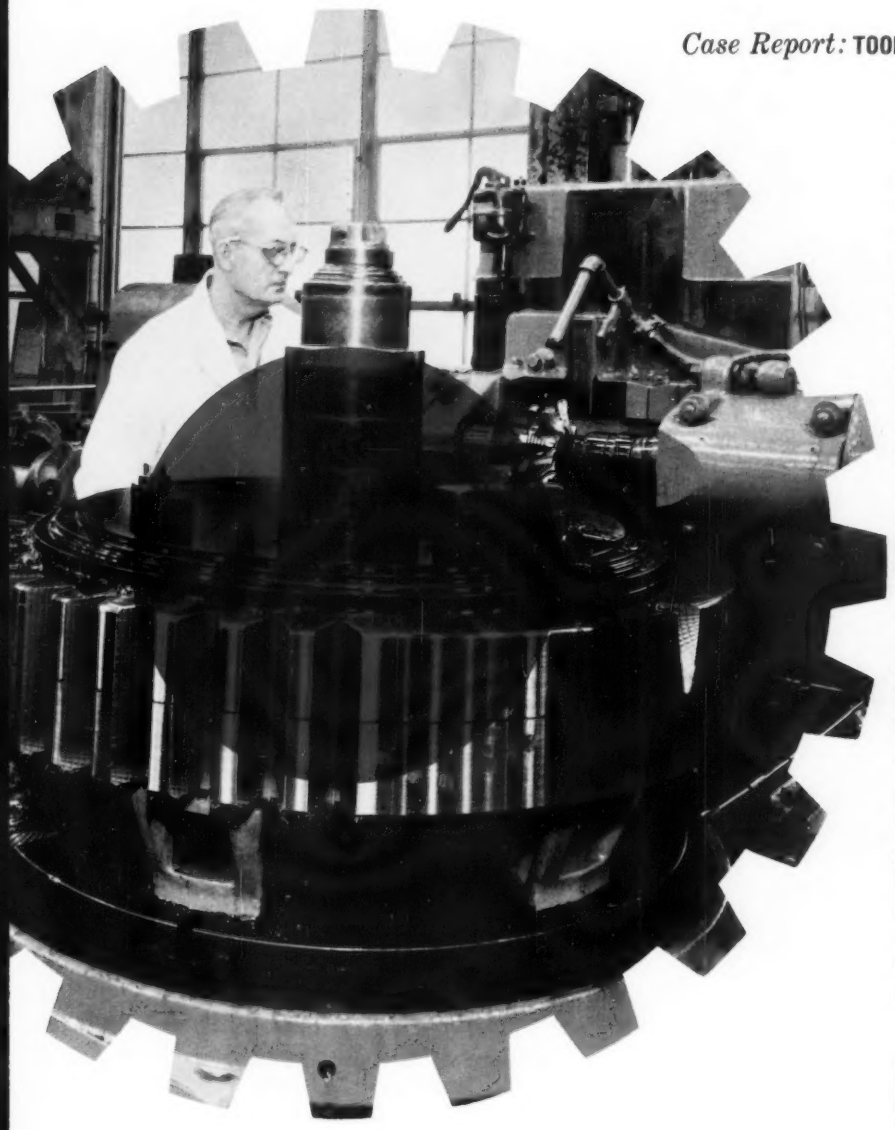


Case Report: **TOOL STEEL GEAR & PINION CO.**

Hi-Qua-Led Forgings
Cut Machine Time 45%

The Tool Steel Gear & Pinion Co., Cincinnati, achieves large savings in gear-machining operations with ALCO's Hi-Qua-Led Steel forged and rolled rings. On one gear ring, for example, Tool Steel reduced turning time 22% before hardening, and 42 % after hardening. Gear hobbing time was cut 43%, rebore 45% and key seating 50%. Average time reduction was 45%.

Hi-Qua-Led forgings machine this easily because of a lead additive which increases shear angle and reduces tool friction. Result: heavier cuts and higher cutting speeds. Expensive tooling lasts longer—five, 10, even 100 times longer.

These big savings are only part of the story. Because Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade, Tool Steel can stand squarely behind its unique guarantee: "Any deficiency made good by cash or new materials."

ALCO

Case Report: WARNER & SWASEY CO.

Increased Capacity with
No Additional Investment

Warner & Swasey Co., Cleveland, uses Hi-Qua-Led open-die forged bars for the pentagon-shaped tool holders in their 2AC and 3AC automatic chucking machines. It adopted Hi-Qua-Led for this job three years ago, because it found that machining speeds on every operation—turning, milling, sawing, trepanning, grinding and drilling—could be increased by at least 50%.

The decrease in machining *time* Warner & Swasey gets is about 3 hours per forging. This compensates for the extra cost of Hi-Qua-Led. But Warner & Swasey reasons that Hi-Qua-Led actually expands its production capacity, without any added investment in factory or tools. This is worth about $60 per forging, according to Warner & Swasey figures.

ALCO

Case Report: LUFKIN FOUNDRY & MACHINE COMPANY

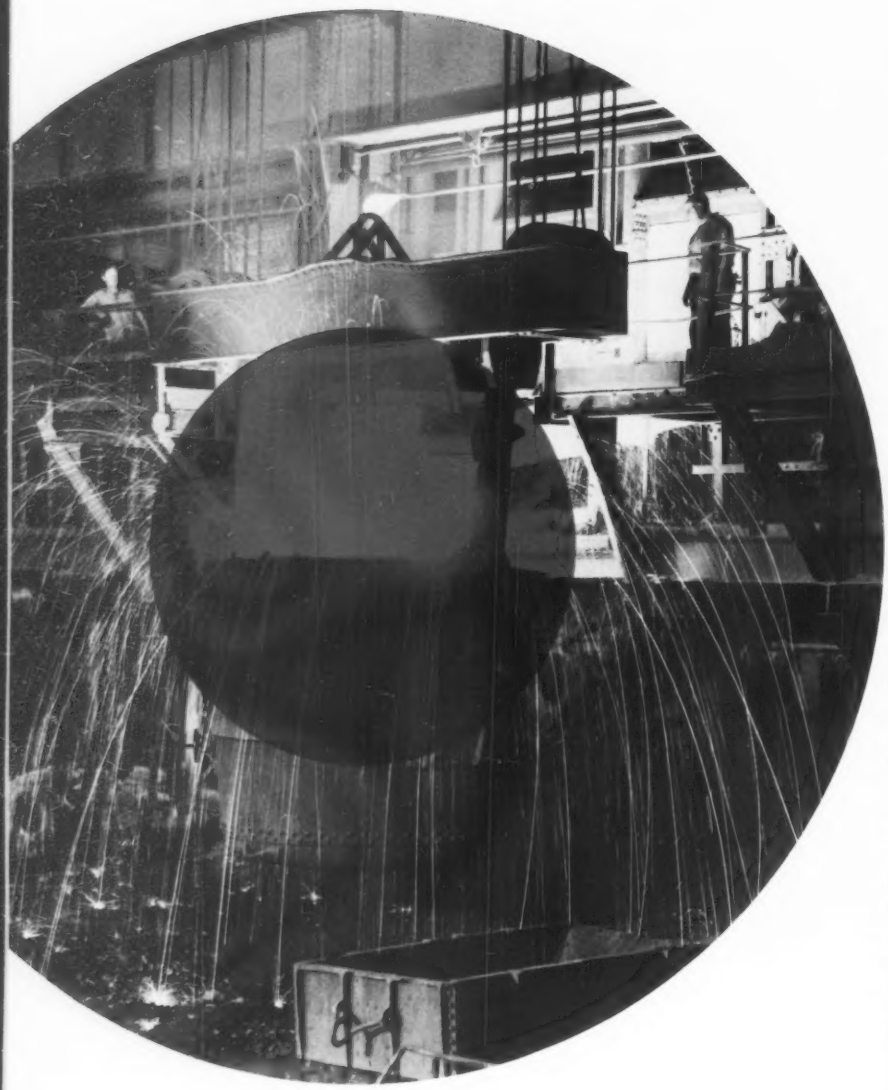
Higher Quality Gears for the Same Cost

Lufkin Foundry & Machine Co., Lufkin, Tex., uses Hi-Qua-Led forged and rolled rings for 60 in. diam. herringbone gears in its large oil-well pumping units. Previously, cast rings had been used.

Lufkin F&M finds that, although the Hi-Qua-Led rings' price is higher, their machinability cuts the cost of the finished fabricated gear to that of the cast gear. Lufkin is thus able to put a better, more uniform gear in its pumping units for the same cost and provide improved equipment and higher value to its customers.

The table below shows how Hi-Qua-Led rings reduced machining costs at Lufkin F&M.

HI-QUA-LED RING vs CAST RING			
OPERATION	**CASTING**	**HI-QUA-LED**	**HI-QUA-LED SAVINGS**
Turning	20 hours	8.1 hours	59.5%
Shape Teeth	80 hours	60 hours	25%
Tool Expense	$75.00	$25.00	67%



ALCO HI-QUA-LED STEEL FORGINGS RAISE PROFIT WITHOUT LOWERING QUALITY

While lowering machining costs, ALCO Hi-Qua-Led forgings have the same mechanical properties as regular forgings of the same grade. "In use" tests show that tensile strength, impact, fatigue and other properties are unchanged. Further, ALCO's exclusive patented lead-addition process guards against lead inclusions or segregates. You get the high quality you expect in custom-forged material.

Hi-Qua-Led Steel rings and forgings are furnished in any steel analysis. If you wish, ALCO will make up your order of regular forgings and include in it a Hi-Qua-Led forging, at no extra cost, for ALCO-supervised tests in your own plant. ALCO Products, Inc., Dept. 1501, Schenectady 5, N.Y.

SIZES AVAILABLE

OPEN DIE FORGINGS — RECTANGULAR
Maximum width — 32 in.
Maximum height — 32 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

MANDRELLED RING FORGINGS
Maximum OD — 82 in.
Minimum OD — 24 in.
Maximum width — 60 in.

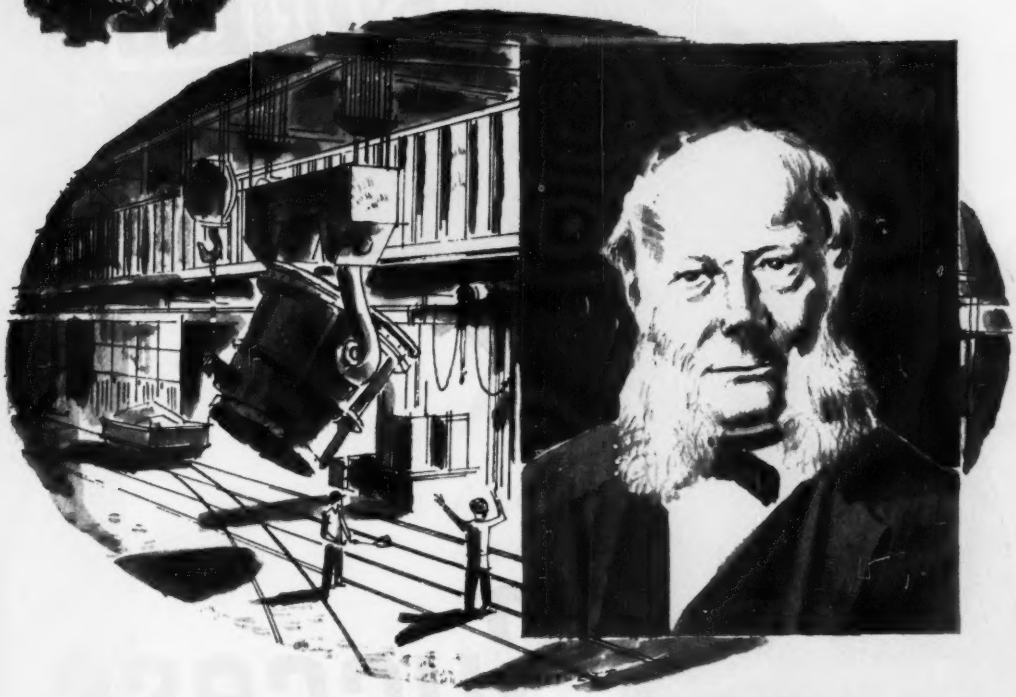
OPEN-DIE FORGINGS — ROUNDS
Maximum OD — 36 in.
Maximum length — 40 ft
Maximum weight — 36,000 lb
Minimum weight — 1,000 lb

ROLLED RING FORGINGS
Maximum OD — 160 in.
Minimum OD — 18 in.
Maximum width — 24 in.

ALCO FORGINGS

ALCO PRODUCTS, INC.

AMERICAN ORIGINALS IN IRON AND STEEL



Father of the Open Hearth Furnace

When Karl Wilhelm Siemens designed his regenerative furnace for glass manufacturing in 1861, he saw the possibilities of his furnace in the production of steel. Siemens granted a license to Pierre and Emil Martin of Sireuill, France, and in 1864 they built what is thought to be the first successful open hearth furnace.

Around 1867, J. T. Potts, Karl Siemens' engineer was building a regenerative furnace to melt crucible steel at the Anderson, Cook and Company plant in Pittsburgh. Assisting Potts was Samuel T. Wellman, an American engineer. Wellman was sent in 1869 to the Bay State Iron Works in South Boston, Massachusetts, to build the first successful open hearth completed in the United States. A furnace with five ton capacity went into operation early in 1870. The good news got around quickly. In 1871 a furnace was built in Nashua, New Hampshire, and at Singer, Nimick & Co., in Pittsburgh.

By 1909, open hearth production surpassed that of the Bessemer process, and today, despite more recent innovations, it remains the foremost process for production of steel in the world.

The first producer of dead-burned dolomite was The J. E. Baker Company. From the beginning, Baker's Magdolite and Jebcolite have offered iron and steel producers more uniform ingots and increased furnace efficiency with lower refractory costs. When you buy, be sure to specify Baker's Magdolite or Jebcolite. They are always 5 ways better . . . in composition, preparation, strength, economy and quality.

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SINCE 1889

BAKER'S MAGDOLITE
The original dead-burned dolomite

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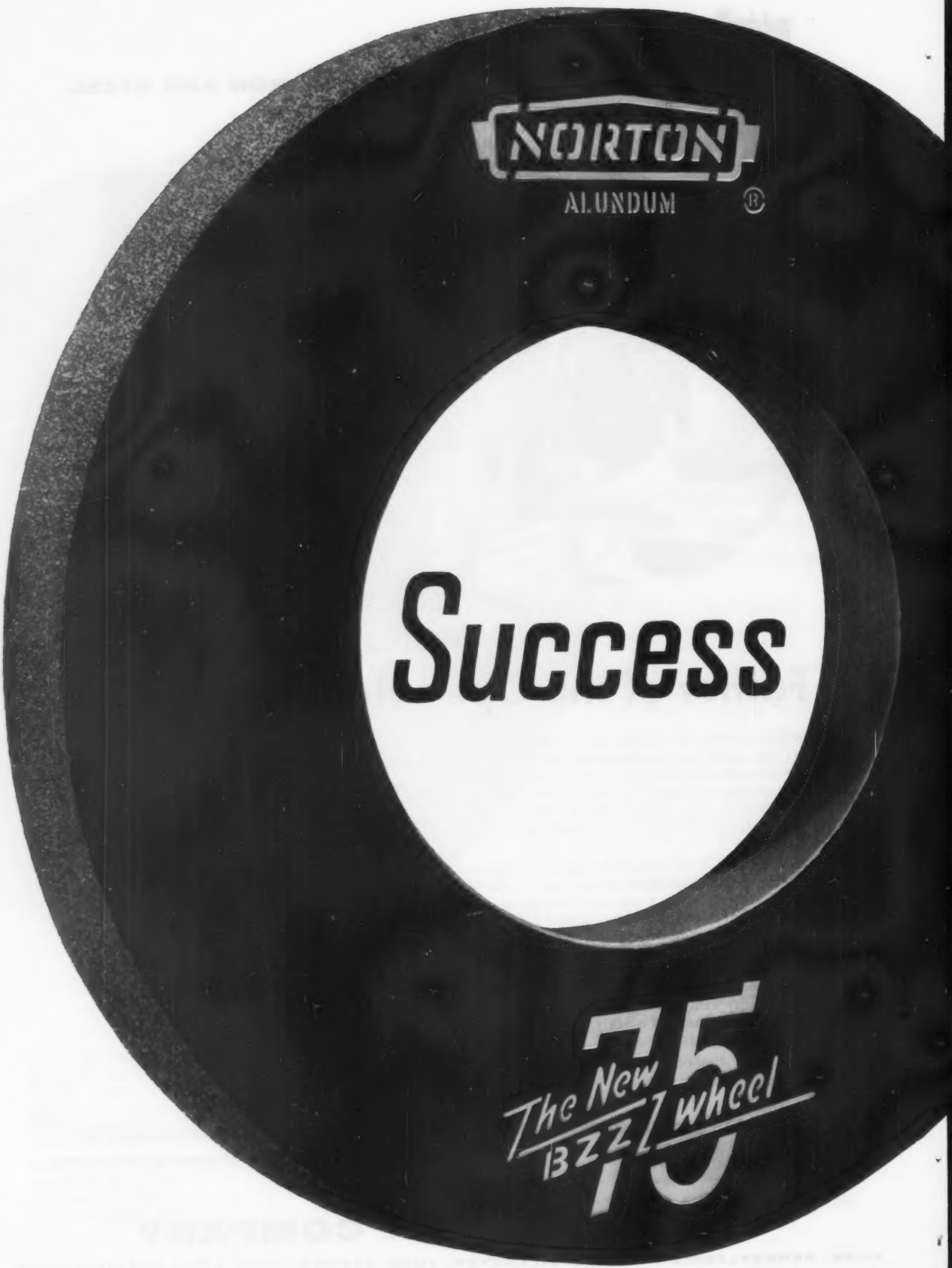
NORTON
ALUNDUM ®
Success
The New
BZZ
75
wheel

From Norton Research

75 ALUNDUM®

A new abrasive for stainless steel grinding that thrives on greater pressure and faster speeds.

We've done it — and on our 75th Anniversary, too! The wheel you see on the opposite page is a major breakthrough in stainless steel slab and billet grinding. It's our new 75 BZZ wheel.

Until now, the greater pressures and higher speeds of the newer automatic grinding machines have not been fully utilized with more conventional wheels. Now Norton offers you the 75 BZZ, a wheel specifically developed to take *full production* advantage of these machines.

Norton 75 ALUNDUM abrasive is a tougher, more durable material, indicated by extensive laboratory and initial field tests. These tests show that 75 ALUNDUM BZZ wheels remove twice as much metal and reduce the total cost per pound of metal removed by as much as 40%. Fast rate of cut . . . longer wheel life explain this performance.

That's the success story of Norton 75 ALUNDUM abrasive — one of the greatest single contributions ever made to grinding wheels used for stainless steel grinding. Contact the nearest Norton office or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

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ABRASIVES

75 years of . . . **Making better products . . . to make your products better**

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NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals — **BEHR-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

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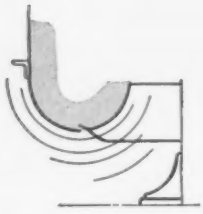
- **High efficiency over a broad range of operation** — ideal for supplying ventilation and air conditioning systems.
- **Stable performance** over the entire range of operation — dependable delivery.
- **Handles pressures up to and including Class IV applications.**
- **Capacities up to 500,000 cfm** and over — in closely graduated sizes to permit exact selection for the job.

"Q" Factor Features Available Only in Buffalo Designs*

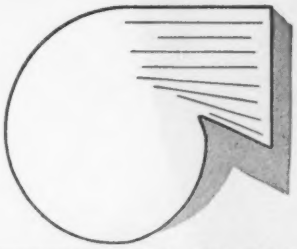


EFFICIENCY AT INLET

Cross-section of inlet, showing smooth half-circle passage into wheel formed by curved inlet bell and mating wheel flange. There are no flat spots to cause turbulence.

EFFICIENCY IN THE WHEEL

Showing deep, backward curve of blades in "BLH" wheel for smooth, quiet handling of air spun into the wheel in the direction of rotation. No waste turbulence.



EFFICIENCY THRU THE HOUSING

Not only is the "BLH" housing streamlined throughout, but its unique fared outlet delivers air to discharge duct with easy, gradual enlargement for best distribution and static conversion.

Write for new Bulletin F-201 for full details.

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

BUFFALO FORGE COMPANY
Buffalo, New York
Buffalo Pumps Division • Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING
FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

SIMONDS ALL-NEW SUPER HIGH SPEED STEEL METAL BAND SAW

This ALL-NEW SUPER HIGH SPEED STEEL Band Saw Blade

comes welded-to-length . . . ready to use . . . in striking, new package with cutting edges protected by a special plastic cover.

PERFORMANCE GUARANTEED!
up to 3 times better than ordinary blades

The biggest advance ever in metal cutting band saw blades — that's Simonds *SUPER* High Speed Steel Metal Band Saw. No matter what ferrous metal you're band sawing, this brand new blade will give you *up to 3 times better performance* than any High Speed Steel blade you're now using!

This is not just a claim but a provable fact backed by Simonds' established reputation as a leading manufacturer of industrial cutting tools.

This *SUPER* High Speed Steel Band is an entirely new concept in band saws . . . new steel*, new manufacturing methods, new heat treatment, new welding techniques, new final inspection.

Laboratory and field tests demonstrate that this new saw is so much better in every way for production cut-off work that we are offering it on a PERFORMANCE GUARANTEED basis! You can't lose — you can cut your blade costs, save on down time, get the equivalent of up to 3 saws in better performance *at a cost of only 10% more than ordinary High Speed Steel blades.*

The sooner you try this new blade, the more you'll save! Get prompt delivery now of Simonds *SUPER* High Speed Steel Band through your Simonds Industrial Supply Distributor or your nearest Simonds Branch.

*Developed and made in Simonds own Steel Mill — Patent Applied For

Your nearby SIMONDS DISTRIBUTOR is your most dependable cutting tool supply source. His stocks and services are designed with your convenience and economy in mind. Call him FIRST for all your industrial supply needs!

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SIMONDS SAW AND STEEL CO.

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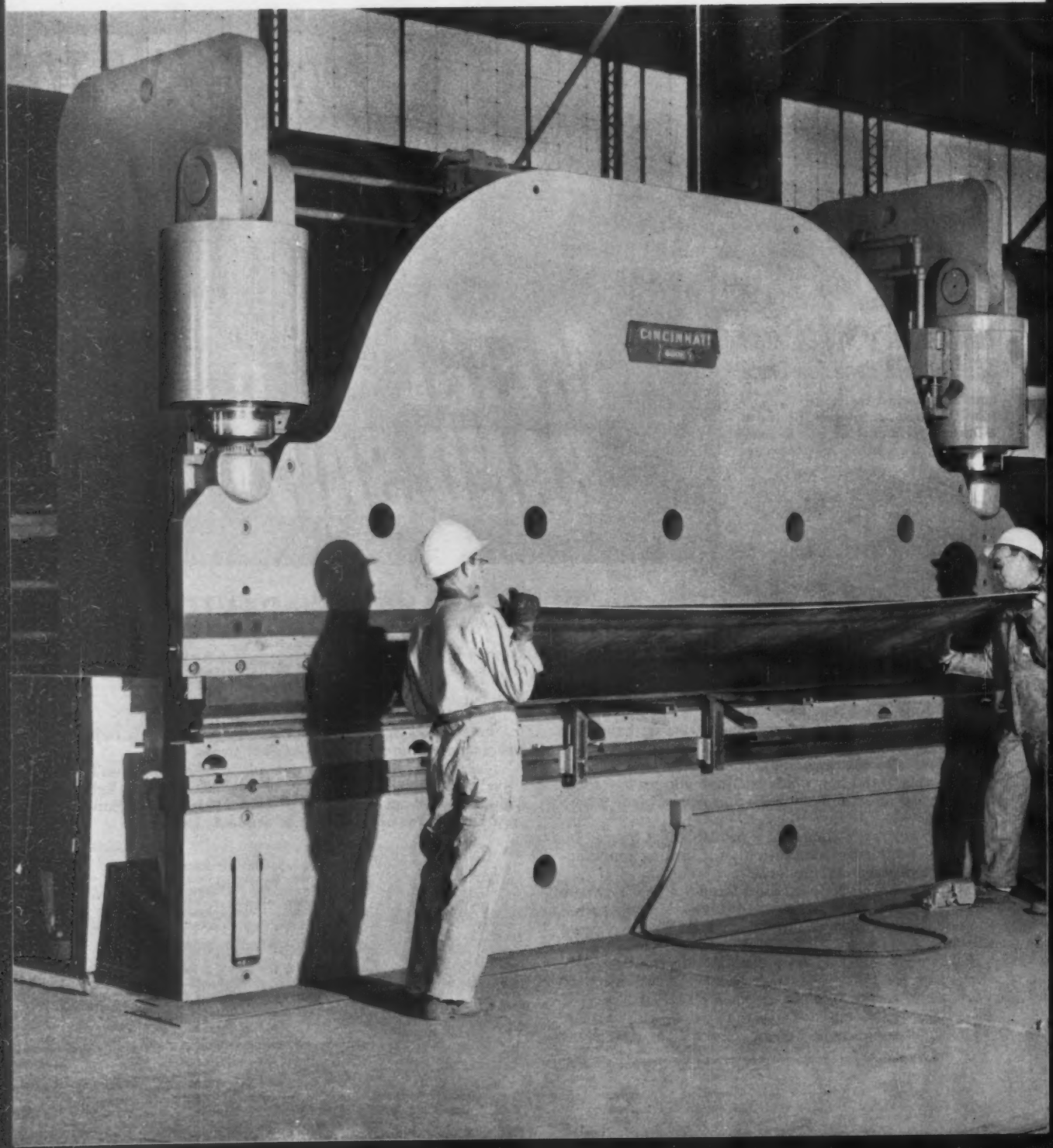


set-up time

Fabricators who bend many different shapes during a day, but only a few pieces of each shape, will increase their earnings with a Cincinnati Hydraulic Press Brake. This installation at the Bannock Steel Company, Pocatello, Idaho, demonstrates the point.

Those varied shapes at the end of the machine were all bent during a single shift. Says Bannock's S. L. Cate: "We have found the flexibility of our Cincinnati Hydraulic Press Brake ideal for this application."

Set-up time is reduced by quick adjustments of stroke depth and upper stop. Dies and machine are protected by Cincinnati Automatic Overload Protection and Adjustable Tonnage Control.

See your local representative for full information on Cincinnati Hydraulic or Mechanical Press Brakes. Check our insert in Sweet's Machine Tool file.

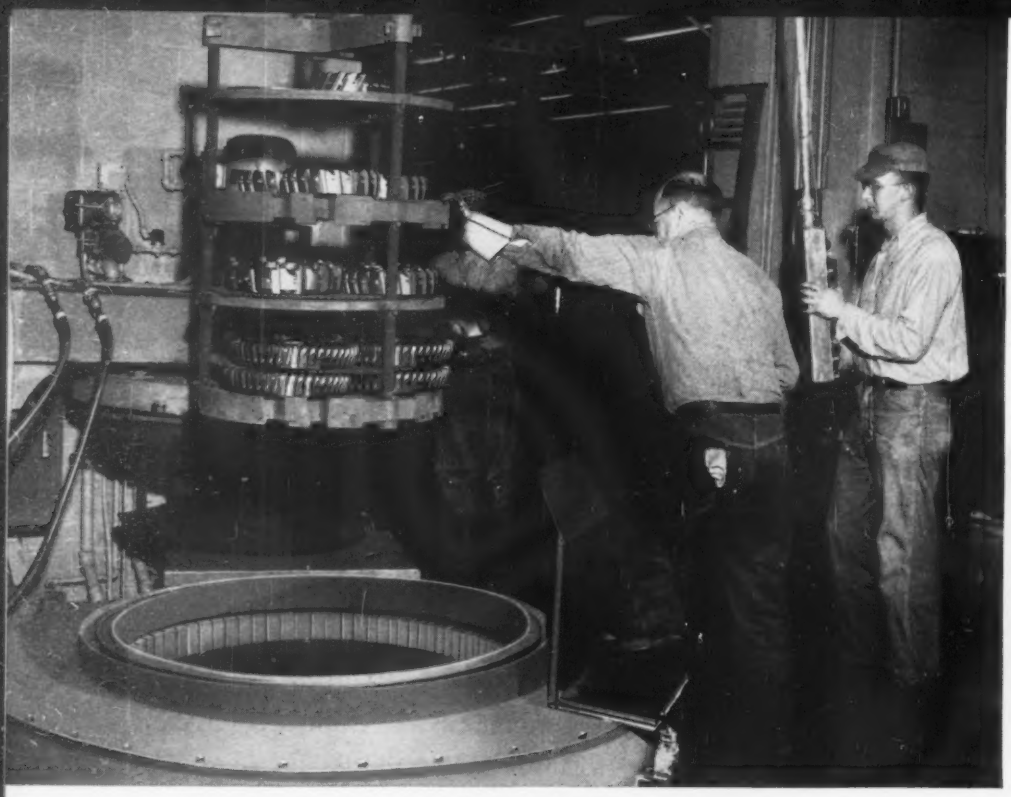
Courtesy the Bannock Steel Company

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow



This Lindberg Furnace, Model CT3848-A, is being used at Ingersoll Milling Machine Company, Rockford, Illinois, for hardening Ingersoll inserted blade milling cutter bodies and also for gas carburizing. It is equipped with Lindberg's exclusive CORRTHERM electric heating elements. Temperature range 1850° to 2000°F.

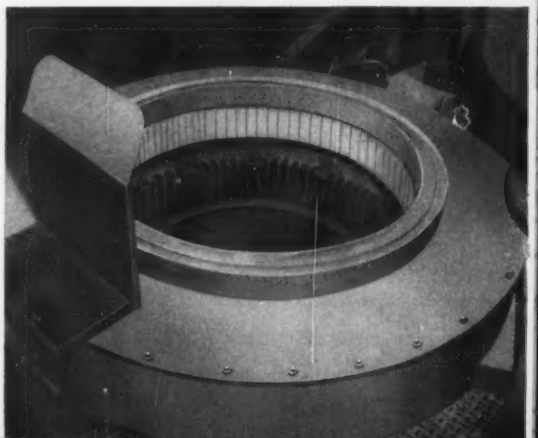
THIS VERSATILE LINDBERG FURNACE BELONGS IN MOST ANY METAL WORKING OPERATION

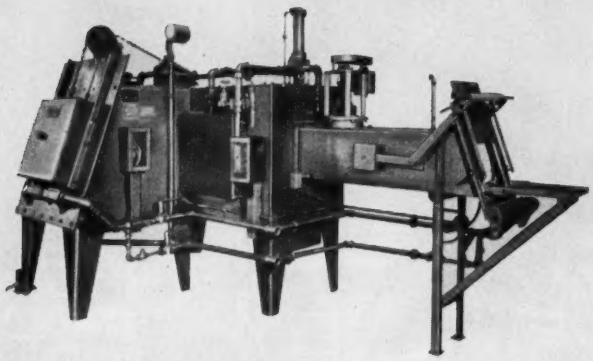
Heat treating installations across the country, captive or commercial, have found the versatility and dependability of this Lindberg furnace, either electric or fuel fired, a great production asset. Used at Ingersoll for hardening and carburizing, it is also ideal for a variety of heat treating needs including normalizing, annealing and tempering. This furnace occupies little floor space, handles a large volume of production and its rugged construction keeps maintenance costs uniformly low. At Ingersoll, it is one of several Lindberg furnaces in regular operation. Others include pit and box type Lindberg Cyclones and an L-type Furnace. Atmospheres are provided by Lindberg Hyen Generators.

Lindberg has developed a wide variety of equipment for any industrial heat treating requirement. We provide everything from individual furnaces to complete, automated heat treating installations. These can either be factory-built or installed in your own plant. For the most satisfactory answer to any heat treating problem see your local Lindberg field representative (consult your classified phone book) or write direct to Heat Treating Division, Lindberg Engineering Company, 2441 West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg, Limited, Toronto.

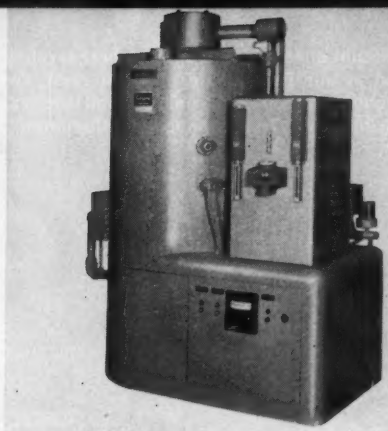
Fixture being loaded with work while furnace is treating another load. Treated load will be removed and new load inserted quickly and easily.

CORRTHERM heating elements operate at extremely low voltage so heat leakage through carbon saturation is eliminated and shock or short hazard prevented. Makes possible use of electricity for carburizing without furnace retort.



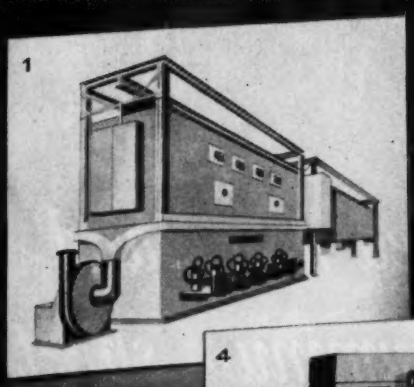


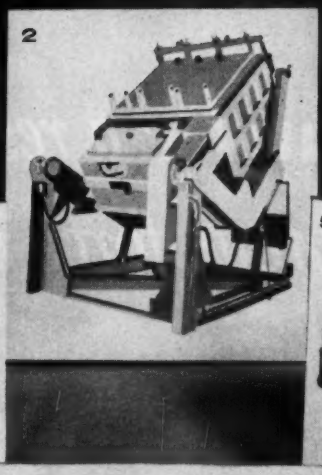
The Lindberg installation at Ingersoll includes one of our L-type Furnaces, ideal for treating high speed steel.

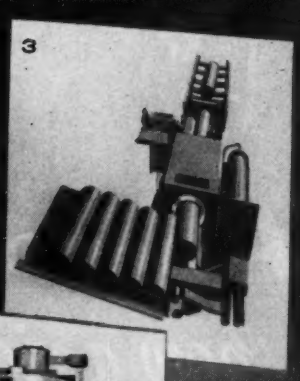


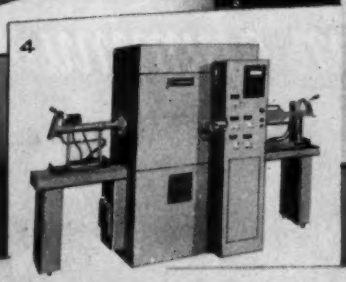
Atmospheres for Lindberg furnaces at Ingersoll are provided by Lindberg's Hyen Generator, a fully automatic process for producing endothermic atmospheres.

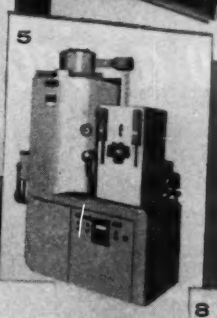
THERE'S LINDBERG EQUIPMENT FOR EVERY INDUSTRIAL HEATING NEED

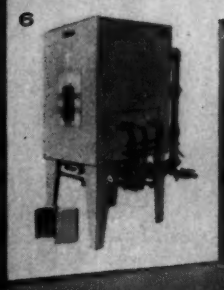


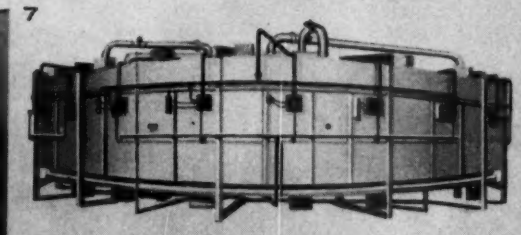












1 Salt Bath Furnaces: Complete line of Lindberg-Upton equipment for all types of salt bath treatment. Shown: Installation for aluminum dip brazing.

2 Melting and Holding Furnaces: Equipment for any non-ferrous metal requirement including electric resistance and induction reverberatories, crucible and two chamber induction units. Shown: 350 KW Induction Furnace with 30,000 lb. capacity.

3 High Frequency Units: Complete range of induction heating units and fixtures. Shown: New Induction Billet Heater for aluminum extrusions.

4 Pilot Plant Equipment: Complete group of intermediate sized furnaces for pilot plant and small production application. Shown: New Graphite Tube Furnace, temperature range 2500°F. to 5000°F.

5 Atmosphere Generators: Generators for all required furnace atmospheres. Shown: Hyen Generator for endothermic atmospheres.

6 Ceramic Kilns: All types of kilns: automatic, atmosphere controlled, high temperature, tunnel and periodics. Shown: Periodic Kiln, temperature range to 3250°F.

7 Heat Treating Furnaces: For every requirement, large or small, electric or fuel fired, factory built or field-installed. Shown: Rotary Hearth Furnace field-installed by Lindberg Industrial Division.

8 Laboratory Furnaces: Complete line of laboratory furnaces from simple hot plates to specialized research units. Shown: Versatile, wide temperature range Laboratory Box Furnace.

For full information on any type of Lindberg equipment see your local Lindberg field representative (look in your classified phone book) or write to Lindberg Engineering Company, 2441 W. Hubbard Street, Chicago 12, Illinois.

LINDBERG heat for industry

An aluminum sheet and plate stretching-leveling operation at our Terre Haute, Indiana, plant. For more information about all our products and facilities, write for booklet, "This is Anaconda Aluminum".

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. . . and you get them fast, too

To give parts, ranging from tiny needles to hefty castings, a fine, uniform finish — and to save substantially on all your finishing jobs — make sure you:

Combine the right barrel finishing techniques with abrasives that perform best—and are delivered to you fast.

From Norton you can get the broadest range of top-performing barrel finishing abrasives. For quick shipments complete stocks of the following TUMBLEX abrasives are maintained at Worcester: random shaped "A" in 14 sizes . . . bonded "T" triangles in six sizes . . . bonded "S" spheres in five sizes . . . bonded "RP" round pins in two sizes . . . bonded "TP" triangular pins in one size . . . "N" natural stones in seven sizes.

You get further assurance of prompt deliveries to help you avoid production delays. Adequate stocks of the most popular TUMBLEX abrasives are kept at your nearest Norton branch warehouse or at your distributor's.

Send samples of your work to our Sample Processing Department. We'll barrel finish, return samples and report the methods and abrasives you need for better, lower cost finishing. NORTON COMPANY, General Offices, Worcester 6, Massachusetts. Plants and distributors around the world.

*Reg. U. S. Pat. Off. and Foreign Countries

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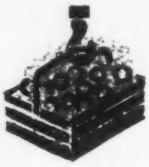
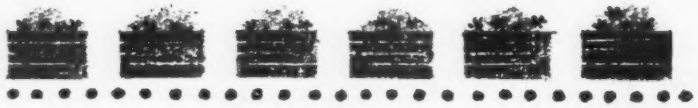
IF you want to HEAT metal....

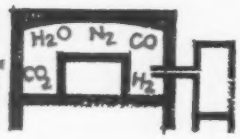
(melting, forging, brazing, sintering or treating).... ferrous, nonferrous or exotic.... whether your parts travel

one at a time **in batches** 

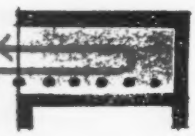
or in droves 

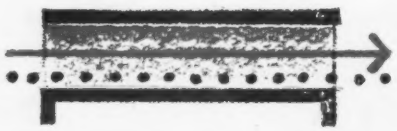
in a straight air atmosphere.... or

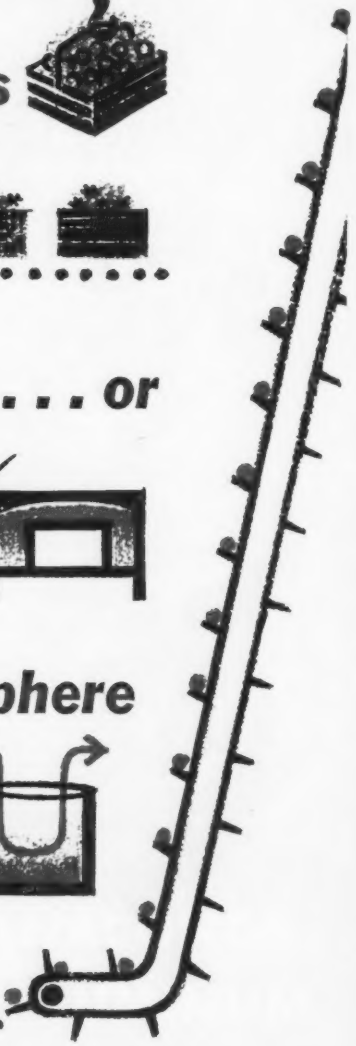
in a protective atmosphere

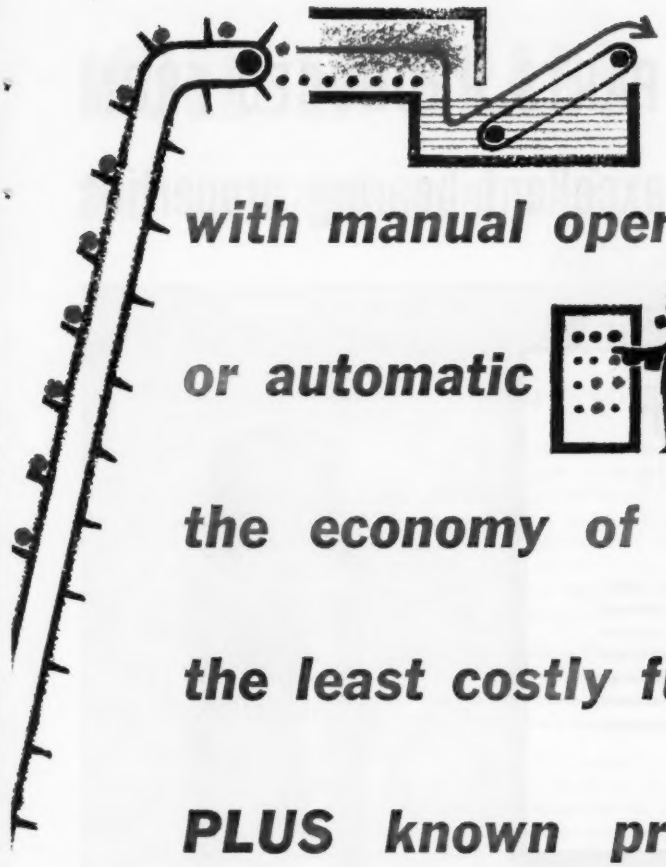
or 

an upgrading atmosphere

in & out...  **down & up**

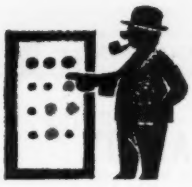
straight through 



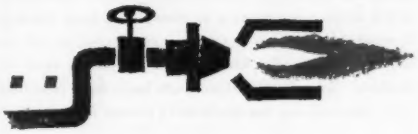


or in a combination

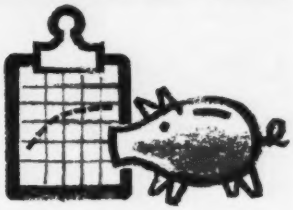
with manual operation



or automatic AND if you want the economy of standard equipment the least costly fuels . . .



PLUS known production rates and pre-rated operating costs



WHAT DO YOU NEED? (pit, pot, box, link, muffle, tube, snap or lab furnace)

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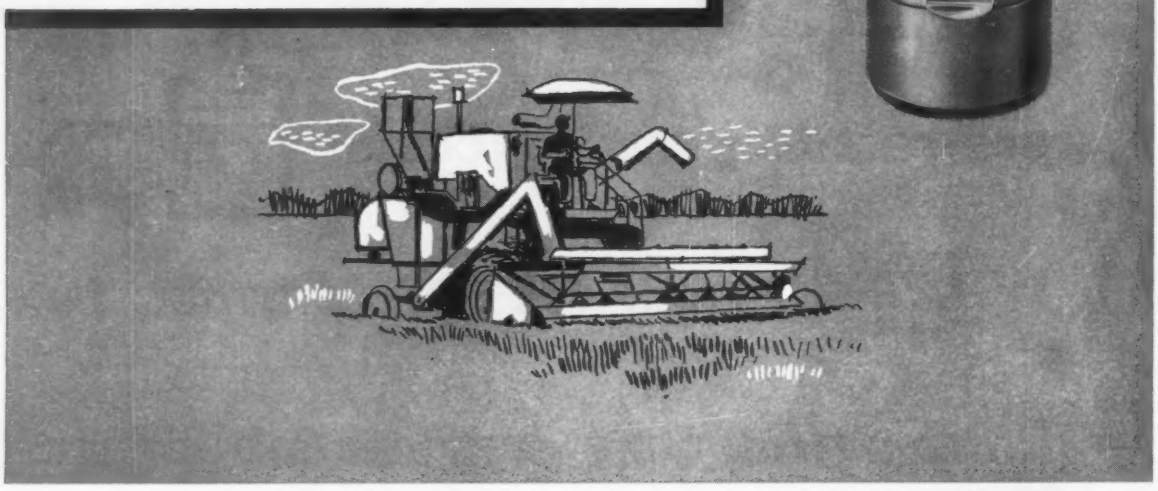
two more cases where PARTS PRODUCED FROM provide excellent bearing properties

CASE HISTORY

MUELLER BRASS CO. 600 ALLOY screw machine product used in heavy duty farm equipment

This heavy duty planetary pinion shaft, made as a screw part from tough "600" series bearing alloy, was the answer to a continuing wear problem encountered in the driving mechanism of heavy-duty farm equipment and big trucks. The part is machine produced to exacting tolerances and all necessary finishing operations are done by Mueller Brass Co. so the pinion shaft is ready for installation when received. Since "600" alloy parts have been installed, no operating failures have been reported and the shafts have proved far superior to the material formerly used.



MUELLER BRASS CO. ANALYSIS SERVICE

You get sound, unbiased advice on the one best method of making your parts because Mueller Brass Co. is the only fabricator in the country offering all these methods of production. An experienced Methods Analysis Department has at its command a complete knowledge of the advantages and limitations of each production process. This unique technical service is your assurance of getting the best product at the best price . . . made the one best way!

COLD-PREST IMPACT EXTRUSIONS

PLASTIC INJECTION MOLDING

MUELLER BRASS CO.

MUELLER BRASS CO. 600 ALLOY

and maximum wear resistance in tough applications

CASE HISTORY

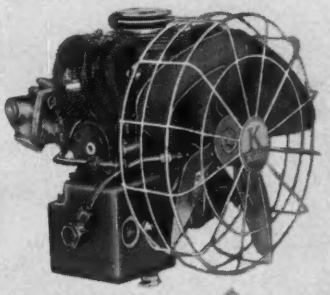
MUELLER BRASS CO. 600 ALLOY forgings used in aviation air compressors

Analyzing the job requirements of Walter Kidde & Company, Inc., for a main driving cam component to be installed in a reciprocating type of aircraft air compressor, Mueller Brass Co. Methods Analysis Engineers decided on a forging fabricated from "600" alloy as the most practical method of production. Since the cam forms the prime component of the driving mechanism, it must have good bearing wear surfaces and because the compressors are used in the aviation industry, the cams must be completely dependable. The close grained, strong forging that resists combination compressive and tensile stresses was the answer.

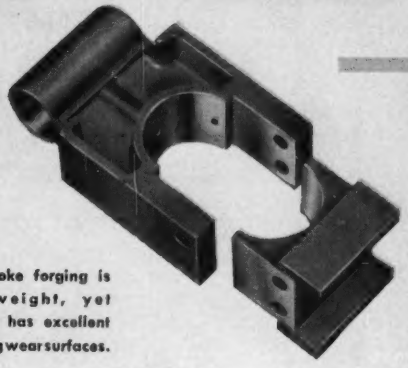
A typical compressor takes in ambient air and compresses it to 3000 psi or higher. This high pressure air is stored in metal or fiberglas containers until needed for actuation of pneumatic system components such as solenoid control valves, brake valves, manual control valves or actuators. These and other pneumatic units retract the entrance door, operate landing gear, wheel brakes, nose wheel steering systems, propeller brakes or perform other functions.

Aircraft in which Kidde compressors are installed include the Boeing 707, the Douglas DC-8, the Lockheed Electra, the Fairchild F-27 and various military aircraft.

Mueller Brass Co. produces press, hammer or cored forgings of any practical shape from a few ounces to 150 lbs. in brass, bronze, aluminum and magnesium in 27 standard, as well as special, alloys.



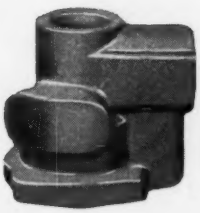
Aircraft air compressor equipped with hydraulic drive delivers air compressed to 3000 psi at the rate of 6 cfm.



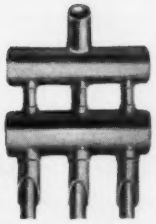
This yoke forging is lightweight, yet strong; has excellent bearing wear surfaces.

Forging is part of the main cam, the prime component of a modified Scotch-type yoke, which is the piston driving mechanism in the air compressor.

POWDERED METAL PARTS



SAND CASTINGS



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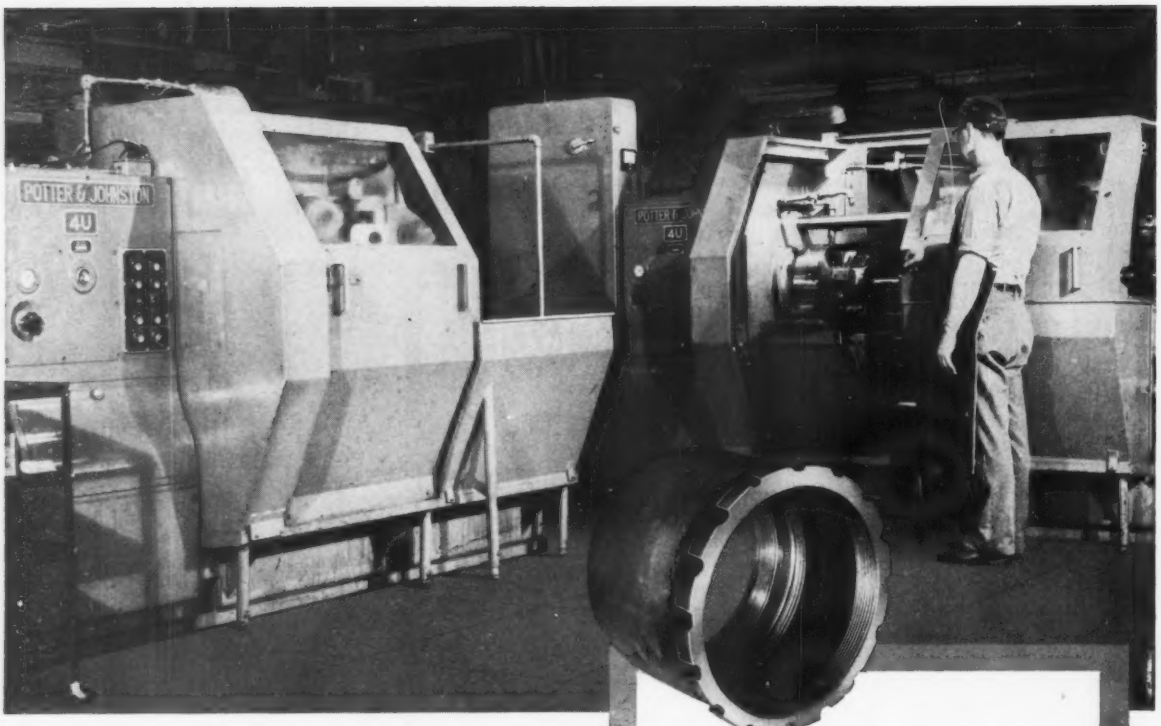


"MACHINING TIME CUT 50-75%

...when we re-equipped with Potter & Johnston® Automatics!"

The world's oldest and largest producer of coal mining machinery, Joy Manufacturing Company, of Pittsburgh, Pennsylvania, was looking for a faster, more economical way to machine a variety of components. After a thorough investigation, which included time estimates for machining 12 different components, 2 Potter & Johnston 4-U Automatic Turret Lathes were selected over several competing makes. Among other factors, the P&J Machines were chosen, because their sturdier construction and greater power meant more metal removed faster, because their 6-face turrets and 2 cross slides provided greater multiple tooling capacity, and because fully automatic operation made it possible for 1 man to operate both machines. On-the-job results have amply justified Joy's decision. For example, machining the typical component shown here, previous time of 22.2 minutes has been reduced to 11.6 minutes using only one P&J Automatic and 5.9 minutes using both machines operated by one man!

Potter & Johnston Automatics helped this manufacturer save time and money—and they can do the same for you! Call the Pratt & Whitney Branch Office in your area and ask one of our Machine Tool Specialists to recommend a production plan for your specific needs. If you prefer, write direct, outlining your requirements. Pratt & Whitney Company, Inc., 13 Charter Oak Boulevard, West Hartford, Connecticut.

JOB FACTS:

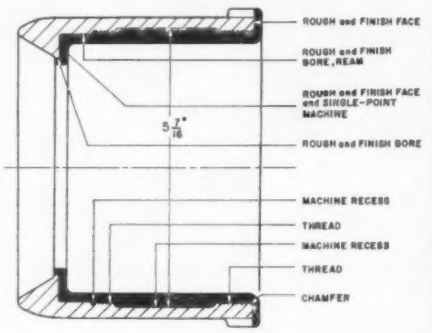
PART: Headlight Bell

MATERIAL: Malleable Iron Casting

REQUIRED: 11 roughing and finishing cuts: boring, reaming, facing, undercutting, grooving, tapping.

THE MACHINES: Two P&J 4-U Automatics operated by one man.

THE RESULTS: An accurately machined part completed every 5.9 minutes.



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Universal Engineer Tractor

(Steel bulldozer that flies)

"What we want is an earthmover that can do the work of conventional scrapers, dozers, and tractors . . . but which weighs only half as much . . . can be parachuted into a combat area, or flown in by helicopter!"

Army ballastable all-purpose tractor, manufactured for Barnes & Reinecke, Inc., by Hendrickson Manufacturing Company, Lyons, Illinois, is built light enough to be transported by air through the use of USS MAN-TEN High-Strength Steel and USS "T-1" Constructional Alloy Steel.

That was the demand made of the U. S. Army Engineer Center, Ft. Belvoir, Va. It was fulfilled through ingenious design using welded USS MAN-TEN High-Strength Steel and super-strength USS "T-1" Constructional Alloy Steel.

The ballastable all-purpose tractor weighs approximately 16,000 lbs. empty; 32,000 lbs. loaded. The weight reduction problem was solved by designers from Barnes & Reinecke, Inc., Chicago engineers. They designed the tractor in three sections—front end, scraper bowl and rear end.

The scraper's yoke, bowl frame, apron ejector, bowl skin and drawbar were welded from 3,370 pounds of "T-1" Steel, which has a minimum yield strength of 100,000 psi. Maximum working stresses on these parts were designed to 60,000 psi, more than triple the working stress that would be used with carbon steel. This permitted maximum weight reduction while retaining strength.

By using USS MAN-TEN High-Strength Steel in the dozer blade and rear-axle housing, they obtained the necessary strength with a reduction in plate thickness from the usual $\frac{1}{2}$" and 1" down to $\frac{1}{8}$" and $\frac{1}{4}$". USS MAN-TEN steel parts totaling 1,350 pounds were designed to a maximum weight reduction while retaining strength.

The machine shown, a feasibility prototype weighing 8 tons, will be superseded by a 10$\frac{1}{2}$-ton production unit powered by a diesel engine instead of an aircraft-type engine. This new item is designed to be conventionally transported by air, and it can be air dropped.

For other military vehicles, United States Steel makes extremely tough, rolled alloy steel armor plate in addition to a complete line of high-strength steels, stainless steels and carbon steels. For more information, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, MAN-TEN and "T-1" are registered trademarks

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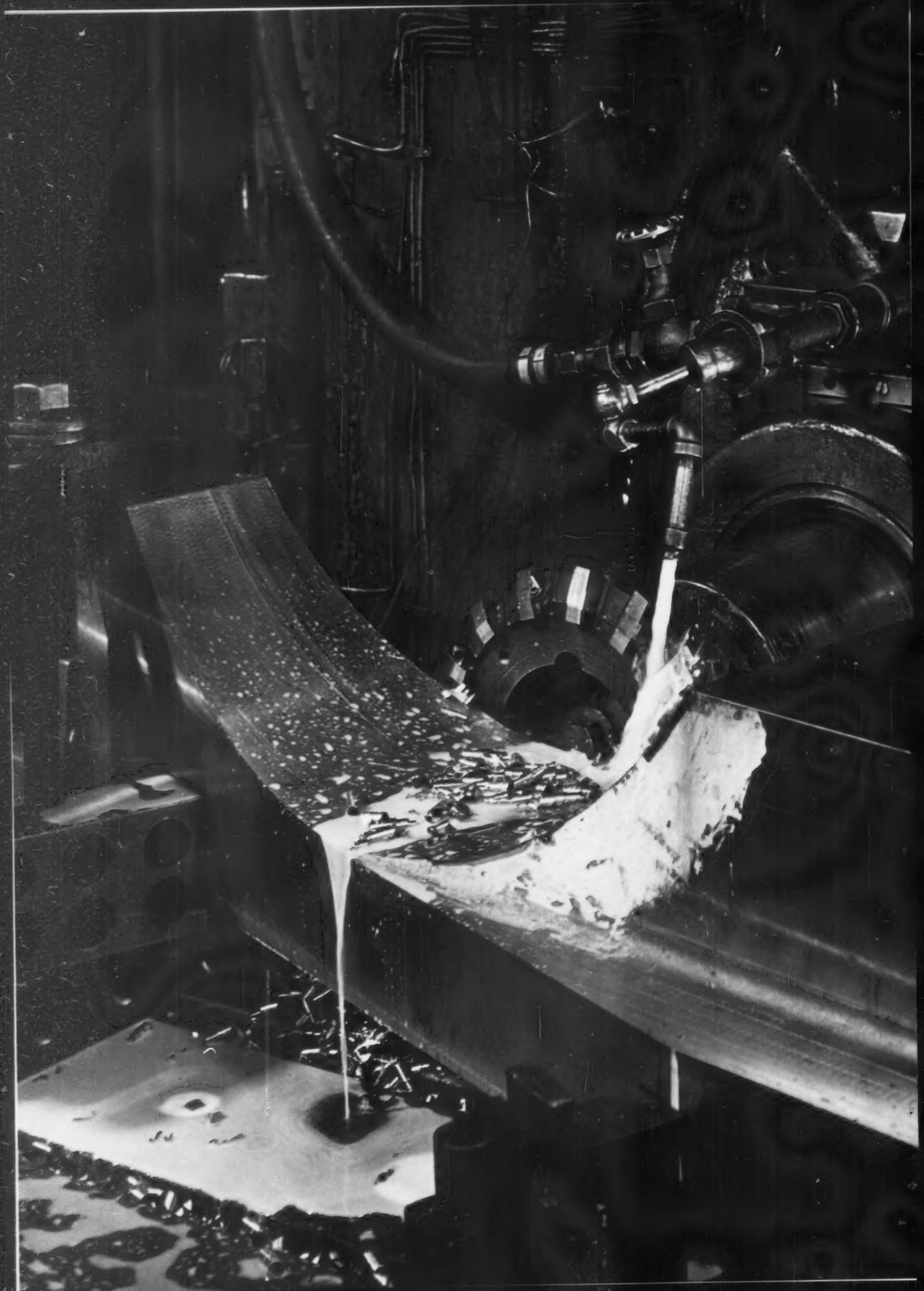
Columbia-Geneva Steel—San Francisco
National Tube—Pittsburgh
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company
United States Steel

USS



This forging may cradle the greatest source of energy on earth

One of the great scientific investigations of all time is now in progress, as we strive for a controlled *fusion* reaction. If we succeed, man will be able to generate a limitless amount of energy using deuterium fuel, a hydrogen isotope, available in inexhaustible quantities from the sea.

Princeton University carries on the study with their Stellarator-type experimental devices. The Model-C Stellarator Facility now nearing completion will cost $35 million and consists of an 8-inch-diameter, 40-foot-long, racetrack-shaped tube to control the reaction. Required ignition temperature is in the order of 100 *million* degrees. Any solid material will evaporate at that temperature, so the hot ionized gas will be confined in a magnetic field of *50,000* gauss in the Model-C Stellarator. The equipment is supported by USS Quality Forgings of Type 305 Stainless Steel.

Altogether, U. S. Steel supplied 17 of these stainless steel forgings, fully annealed, to Allis-Chalmers Manufacturing Company, major contractor for the new Model-C Stellarator.

The steel for the forgings was forged, heat-treated and machined at U. S. Steel's Homestead Plant. Each forging measures 60¼″ long, 21¼″ wide at the base, 15⅜″ high and weighs about 2,450 pounds rough machined.

United States Steel makes many forgings for the nuclear industry. Here, a team of *experts* supervises and *controls every step* of forging production. This same team can handle your forging requirements. If you would like additional information about USS Quality Forgings, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

United States Steel Corporation—Pittsburgh
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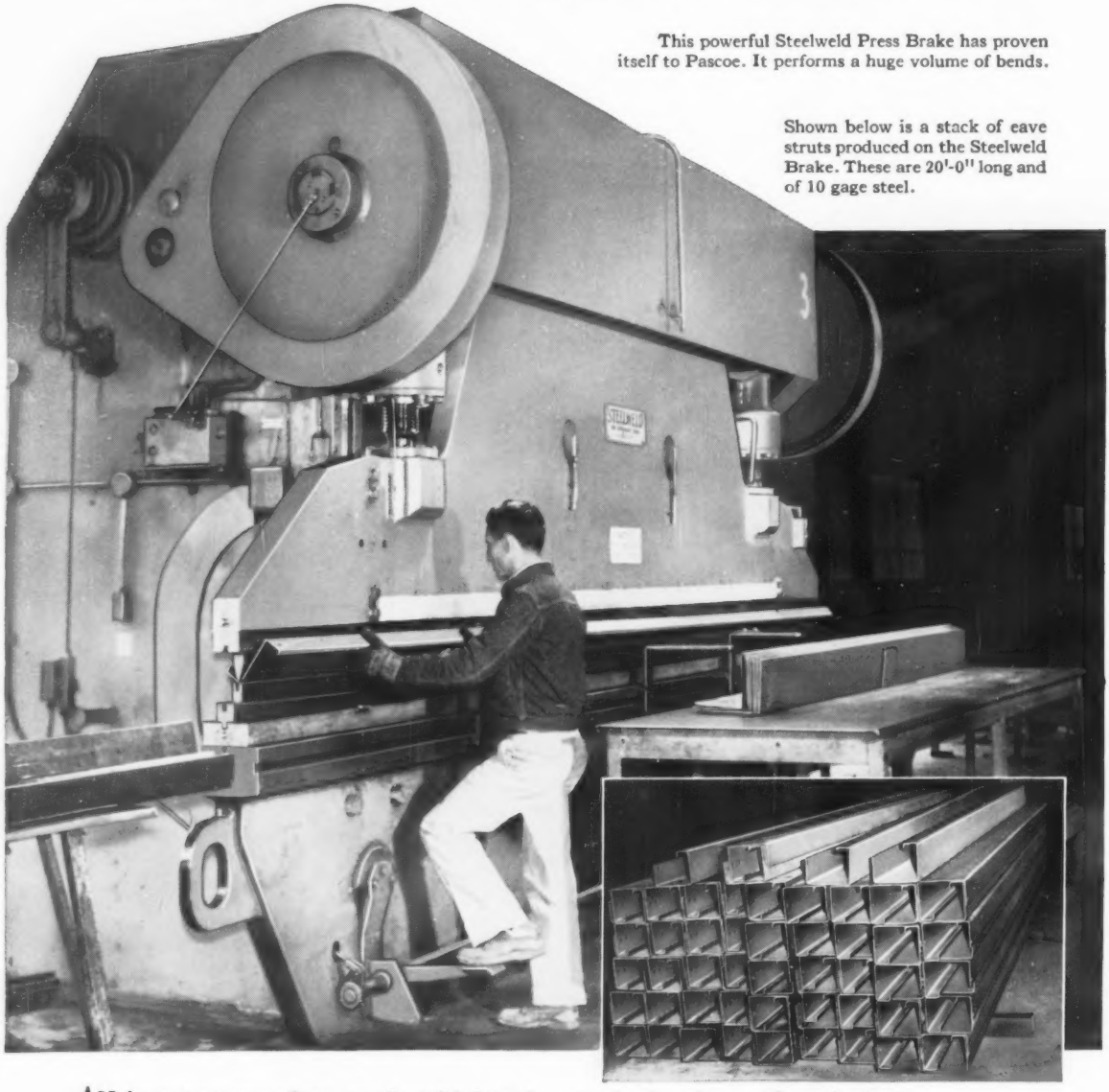
United States Steel

USS

STEELWELD BRAKE
AIDS PASCOE BUILDING PRODUCTION

This powerful Steelweld Press Brake has proven itself to Pascoe. It performs a huge volume of bends.

Shown below is a stack of eave struts produced on the Steelweld Brake. These are 20'-0" long and of 10 gage steel.



AN important manufacturer of prefabricated steel buildings on the West Coast, the Pascoe Steel Corporation, Pomona, California, keeps their Steelweld Press Brake going full tilt in order to keep up with the production schedule.

The brake normally handles steel up to 20'-0" x 3/16", although occasionally 1/4" metal is formed. It has the speed and power to produce sharp accurate bends at a fast rate.

Despite all the work put through, only the meagerest amount of maintenance is required. For instance, the clutch has had to be adjusted only once, every eight-month period and this can be done in very few minutes.

Pascoe builds a complete line of pre-engineered buildings which are used for warehouses, light manufacturing, grain storage, auditoriums, aircraft hangers, etc.

Write for free copy of catalog No. 2023A

STEELWELD

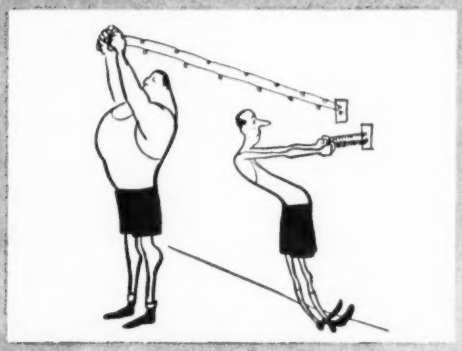
Mechanical and Hydraulic

PRESS BRAKES

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

THE CLEVELAND CRANE & ENGINEERING COMPANY • 7873 E. 281st STREET • WICKLIFFE, OHIO

VISCOSITY COIL



EXECUTIVE COILS

SAFARI COIL

What do "Coils" mean to you?

Coils call to mind so many things. But if to you they mean springs, those mechanically precise activators of energy, then we're on common ground. Our organization specializes in all kinds—compression, extension, torsion, flat coil, volute . . . maintains unequalled engineering and manufacturing facilities throughout the nation. So let us supplement the work of your own engineers with our specialized knowledge and experience in the design and manufacture of springs, small stampings, and wire forms . . . made to your specifications.

Our "Picture Book of Springs" shows thousands of custom-produced parts, typical of our service. Write for a copy to pass along to interested people in your organization.

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Gibson Division, Chicago 14, Ill.
Milwaukee Division, Milwaukee, Wis.
Raymond Manufacturing Division, Corry, Penna.
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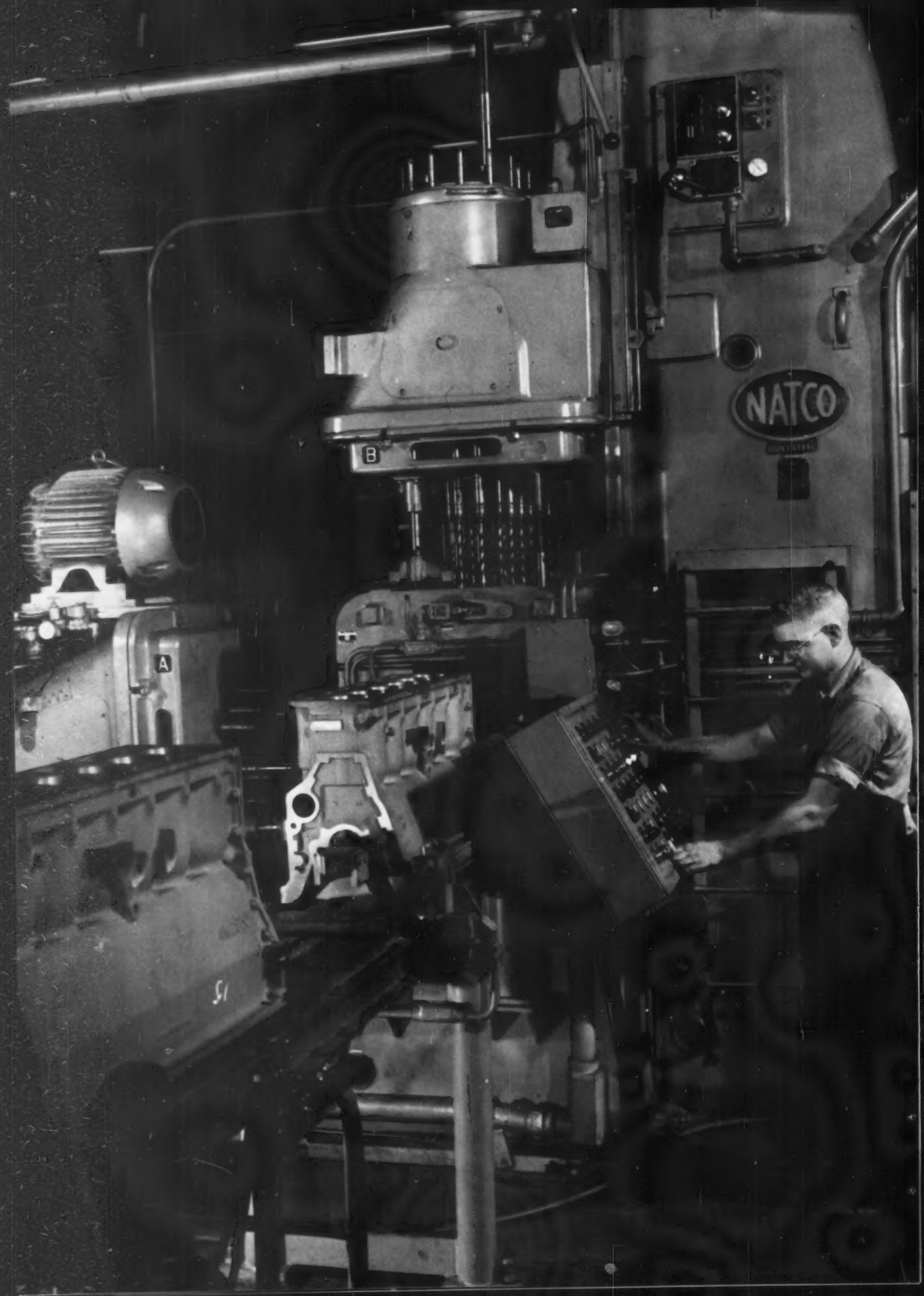
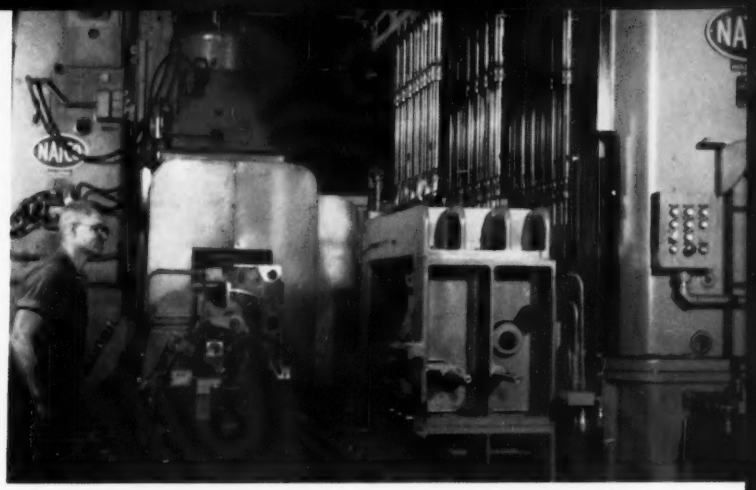
Cleveland Sales Office, Cleveland, Ohio
Dunbar Brothers Division, Bristol, Conn.
Wallace Barnes Steel Division, Bristol, Conn.

Canadian Subsidiary: The Wallace Barnes Co., Ltd., Hamilton, Ontario and Montreal, Quebec

5933


NATCO
B
A

From one pushbutton station, the line operates as a single unit, but each machining element has its own controls for independent operation.



A "medium" production transfer line like this can be built by adding as little as 12½ per cent to the cost of the individual machines.

New Convertible Transfer Line Trims Costs of "Medium" Production

By linking four standard Natco multiple-spindle drilling machines with transfer devices, Caterpillar Tractor Co., Peoria, Ill., has substantially reduced the cost of drilling and reaming diesel cylinder blocks. The transfer line incorporates three standard Natco 2-way machines and one vertical C4B.

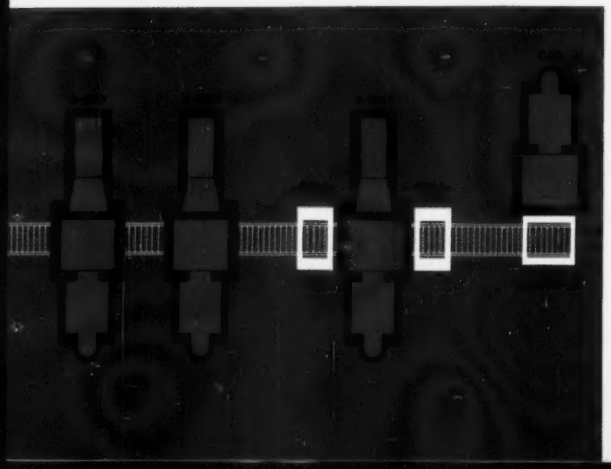
Each machining unit is self-contained with its own hydraulic and electrical system. Machine units can be interchanged or removed from the line for independent operation. Transfer links are standard Natco types.

Take advantage of this new approach to "medium" volume production by calling your Natco representative. Write for bulletin No. 100.

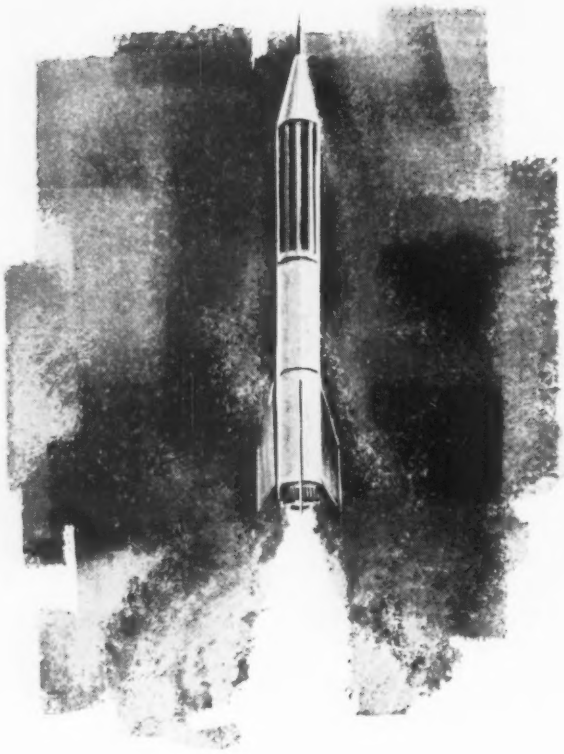
NATCO

The National Automatic Tool Company, Inc., Richmond, Indiana

Rollover, shuttlebar, and walking beam transfer devices link the various machining units of this unusual line.



Rollover device repositions cylinder block. Other Natco transfer devices resolve the loading differences between machining units, providing both in-line and cross-line motion.



New steels are born at Armco

from missiles to mowers . . .

Sheffield has the right bolts

The world is so full of things. And so many of them are made with bolts. From rockets that shoot for the moon, to mowers that trim the lawns of suburbia. The list is next to endless.

Meeting the many different needs for steel bolts takes a lot of doing. Sheffield does it with one of the world's largest bolt plants, staffed by an expert team of specialized bolt metallurgists, engineers, research and quality control men.

All of which means you can be sure of quick delivery of all your bolt needs, in any quantity, for any job, from a single source. Whether it's standard or special bolts — or bolts custom-made to your specifications — you can be sure of getting the right bolt, right on time, from Sheffield. Just call your Sheffield Man.

SHEFFIELD
ARMCO

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ARMCO STEEL CORPORATION

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This lightweight "No Charge" spool is typical of Roebling's modern packaging methods that save customers time and money.

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When you pay for HIGH QUALITY high-carbon wire, you want to be sure you get it. You do, when it is supplied by Roebling.

It is unsurpassed in quality, consistently true to specifications, and absolutely uniform in gauge. Hundreds of manufacturers attest to this fact... the qualities that they *pay* for — they *get* in Roebling high-carbon wire. The length of our relationship with customers proves it.

We'll be glad to show you what we mean. For information on superior high-carbon wire or cold rolled strip, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

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Roebling... Your Product is Better for it

Free rolling . . . long lasting because it's *Self-Aligning*

Link-Belt roller bearings compensate for misalignment of shafts and supports

Link-Belt Series 400 roller bearings have won a reputation as "the designer's choice." These self-aligning, double-row roller bearings compensate for inaccuracies in machining and assembly of equipment while maintaining full load capacity throughout their long life. Their compactness promotes simplicity of machinery design—their easy mounting reduces installation costs.

For complete information on the Series 400 —and Link-Belt's complete line of ball and roller bearings—send for our Book 2550. It's available at any one of the 40 Link-Belt offices or your authorized stock-carrying distributor.

Look under BEARINGS in the yellow pages of your phone book.

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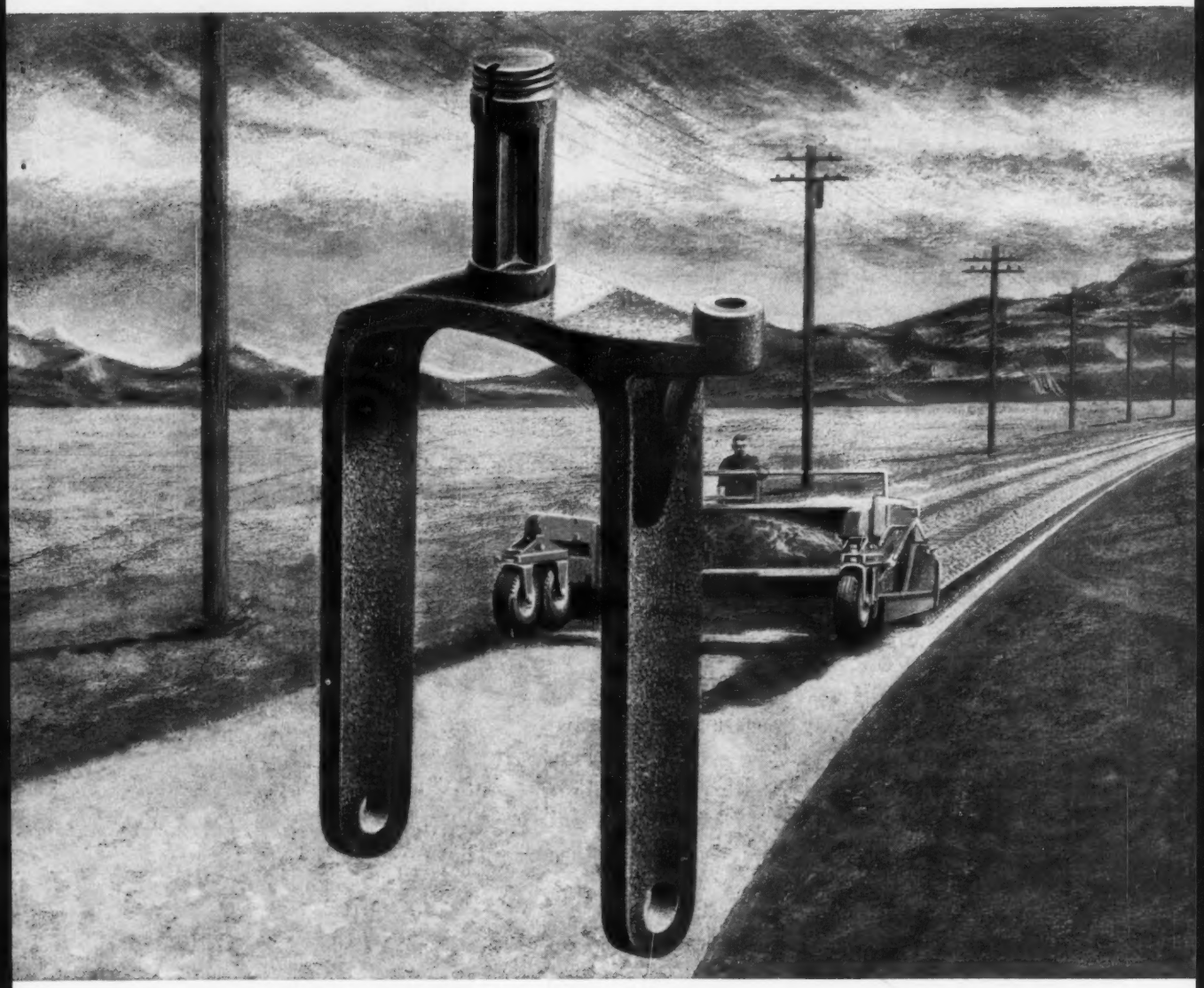
How the Foundry Industry Serves America . . . #6 of a Series



CAST IRON WHEEL FORK REPLACES WELDMENT . . . CUTS COST 29%

Rugged construction of every single part is vitally important in the manufacture of road building equipment.

Capable of spreading up to 400 tons of base materials per hour, the aggregate hopper of the 12-ton base paver, shown above, is supported and steered by front wheel forks. These must take a terrific pounding day after day, to assure maximum service life for the entire unit. Originally the forks were made from steel weldments. They were redesigned to high strength gray iron castings. This reduced manufacturing operations from nine to three, and cut fabricating costs by over 29%. This is just another example of how modern iron castings can solve many of the problems of industrial design and at the same time effect substantial manufacturing savings.

For the production of structurally sound iron castings, Hanna Furnace provides foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorous, as well as HANNATITE® and Hanna Silvery.

Facts from the files of Gray Iron Founders' Society

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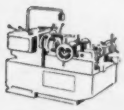
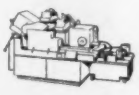
THE WORLD'S LARGEST MANUFACTURER OF THREADING EQUIPMENT



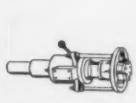
Threading Machines

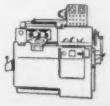
Die Heads—Rotary & Stationary

Centerless Thread Grinding Machines



Taps—Collapsible & Solid Adjustable



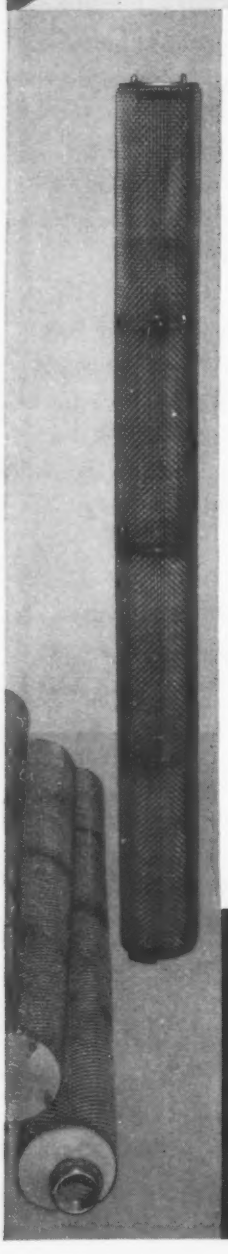


Thread Rolling Machines

Thread Rolling Tools

MMT-PE

BOOTH NO. 432



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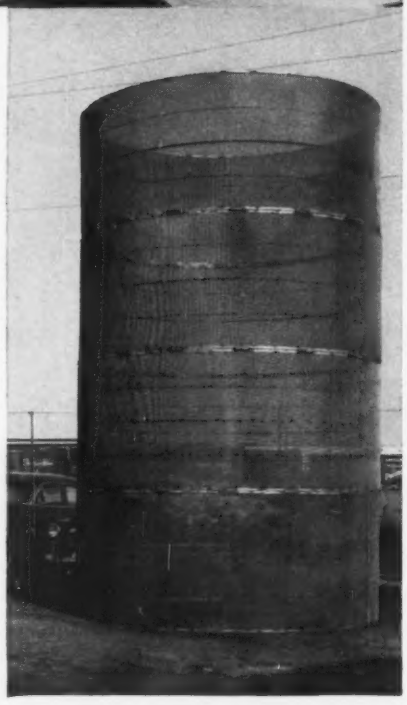

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SPOTLIGHTING HOW T & W'S WIDE RANGE FACILITIES HELP INDUSTRY:

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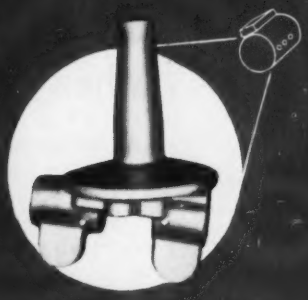
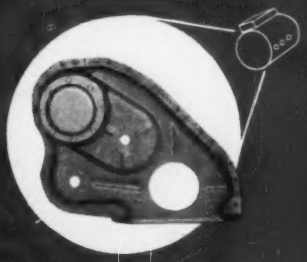
STEERING SPINDLE FORGING



Intricate, vital in its function, this forging must be strong and reliable. Metallurgical laboratory, die designer, hammerman all contribute to the T & W Technique which makes it successful.

STAMPED GEAR COVER



A welded assembly of both stamping and forging for a design of maximum strength. Part is 11 gauge and measures 17½" wide, 12¾" high and is 1¼" deep.

WRITE FOR COMPLETE INFORMATION

To find out how you can benefit from T & W's help, write for the 20 page booklet "Transue & Williams Challenges the Future."

FORGINGS & DEEP DRAWN STAMPINGS

TRANSUE & WILLIAMS

ALLIANCE • OHIO, U. S. A.

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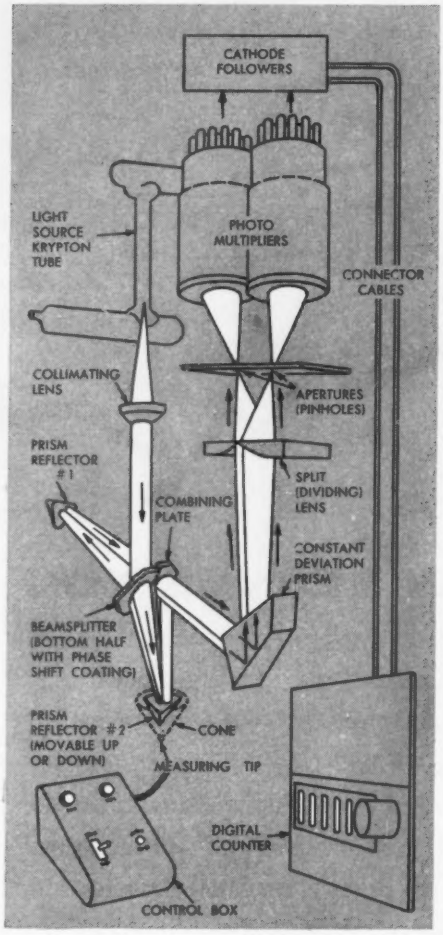
...when "tonnage is produced on a laboratory basis"—

At Wallingford, stainless steel strip having close tolerance specifications is thoroughly cleaned before final inspection because contaminants have weight; and non-contact gages measure all weight within the throat of the measuring head. A sample is then taken from the coil, delivered to a temperature controlled room and measured with a Fringecount Micrometer – interferometer, control box and counter – to compare the thickness of the sample to the wave length of a krypton light source.

As the diagram at right shows, the movement of the measuring tip modulates the krypton light source and produces fringes which are detected and counted. This reading is then converted to thickness of the test piece. After measuring, the sample returns to the line; the gaging equipment is zeroed against the known thickness, and processing starts up again. By taking a sample from each coil, ***it is almost impossible to have an error caused by variation in density between different alloys.***



Do your suppliers measure close tolerance stainless steel strip with such exactitude? Why not purchase ***your*** stainless steel strip where ***tonnage is produced on a laboratory basis?***

Facilities for widths up to 27" – thickness down to .001" – extremely close tolerances maintained. Write for new folder on stainless steel strip.

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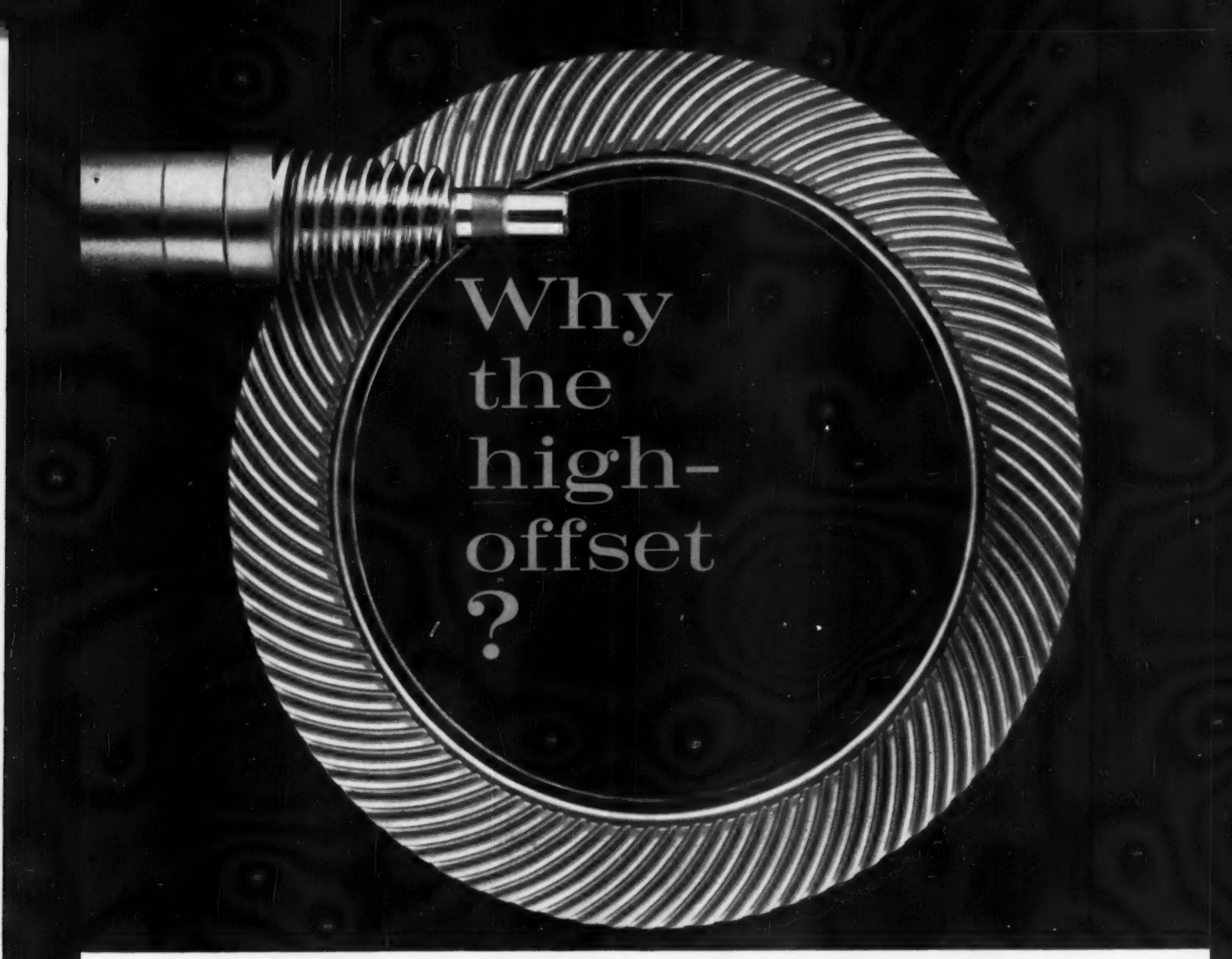

...and where can you use it profitably?

High-offset makes a difference!

It's the difference that lets you combine *high-reduction* with strength, compactness and other advantages you might find profitable in certain applications. For instance . . .

For smooth operation—as in office equipment that must run quietly—high-offset pairs provide smooth, quiet tooth action. Because the teeth "wrap around" the pinion, *you get continuous action—even with just one or two teeth.*

Where space is a problem—as in instrumentation—the high-offset lets you design a more compact unit. Choose just the offset to solve your design problem with a more flexible, more compact unit than the corresponding worm and wheel.

Where you need strength—as in farm machinery—high-offset hypoid pinions with teeth, which tend to "wrap around," are larger and stronger than corresponding bevel pinions.

High-offset or high-ratio hypoids can be cut on the same Gleason equipment that is used on more familiar spiral bevel and hypoid gears. You can also use the same testers, quenching presses and other auxiliary Gleason equipment you're using now. Grinders are available for applications requiring precision finish. For ratios of 1:10 or 1:40 or even higher.

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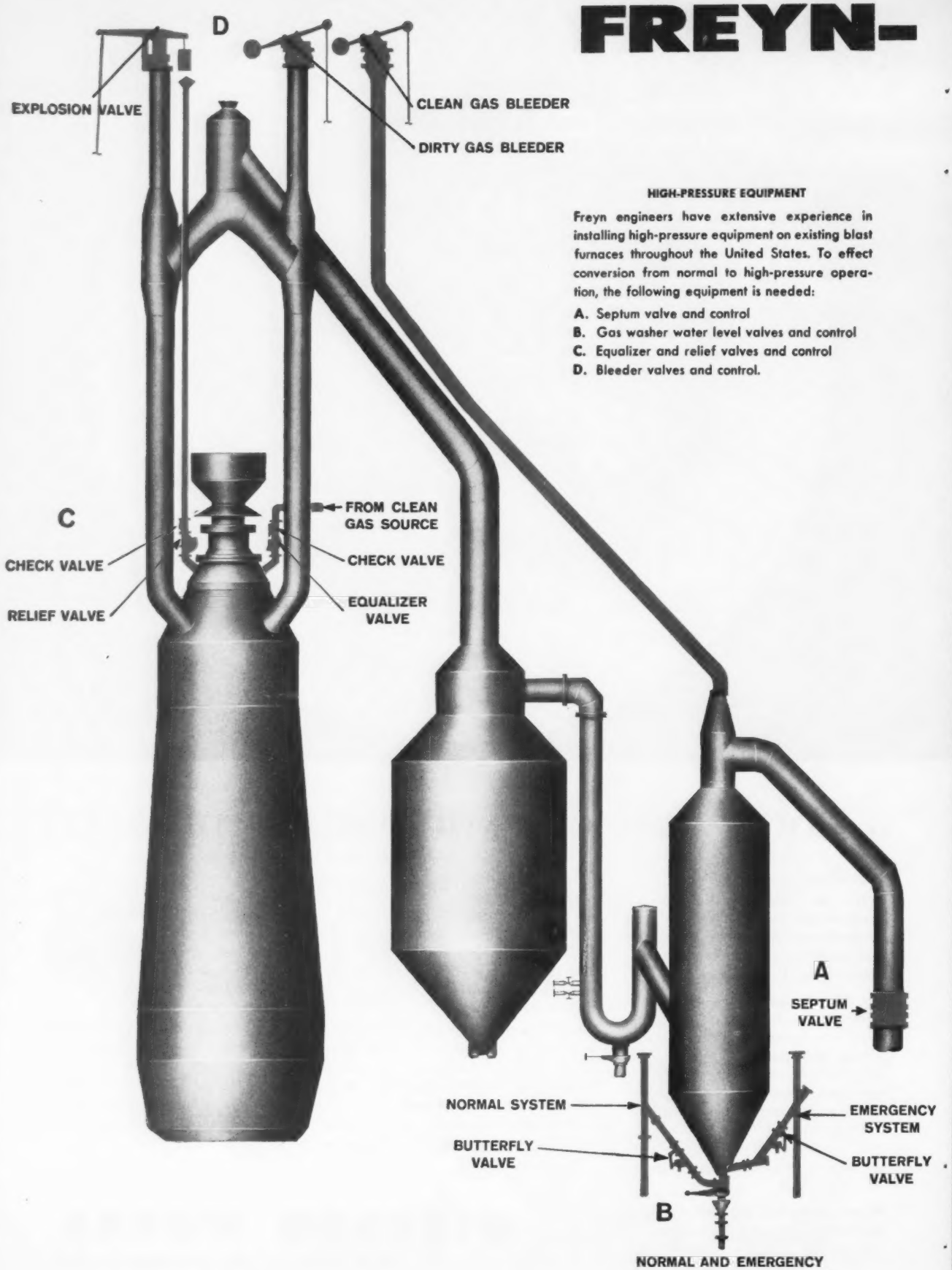


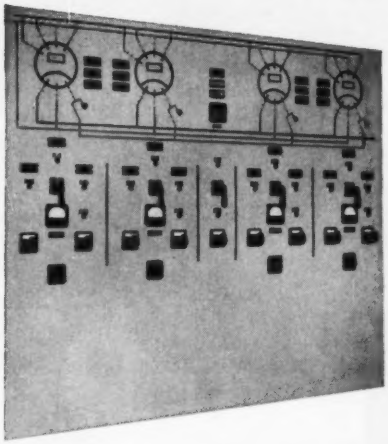
HIGH-PRESSURE EQUIPMENT

Freyn engineers have extensive experience in installing high-pressure equipment on existing blast furnaces throughout the United States. To effect conversion from normal to high-pressure operation, the following equipment is needed:

A. Septum valve and control
B. Gas washer water level valves and control
C. Equalizer and relief valves and control
D. Bleeder valves and control.

DESIGN EQUIPMENT

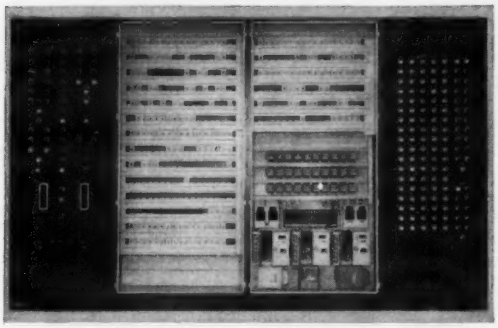
helps set new standards for blast furnace output



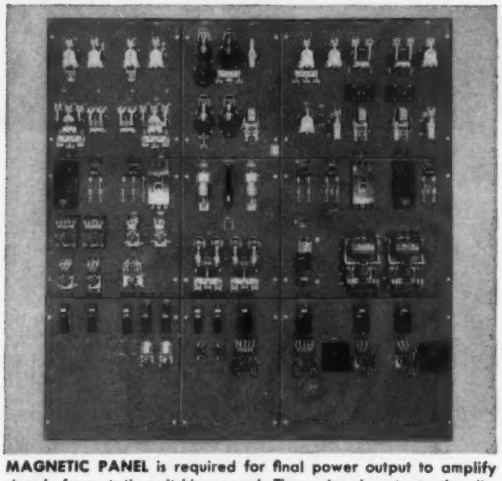
SYNOPTIC PANEL. Developed for use with completely automatic, electrically operated stove changing equipment, this master control panel is currently being installed in a large Northeastern plant. At a glance, the stove tender can quickly tell whether a stove is "on gas," "on blast," or "bottled up." Panel shows complete blast furnace piping arrangement, and is a graphic representation of the exact condition of the valves on each stove. Characteristic colors are used: Brown—stack gas; Blue—cold blast; Orange-Red—hot blast; and Yellow—gas. By pre-setting a selector switch, the stoves will be automatically changed in response to either time or temperature, without any attention from the stove tender. Provision is also made to take any one stove out of service and remain on a completely automatic sequence. Time loss in stove changing is greatly reduced.

In over 40 years as a leader in the design and construction of a complete line of blast furnace equipment, Freyn has pioneered many developments which have resulted in increased efficiency and greater output. You benefit from this unique combination of experience and service, because you know Freyn equipment can be depended upon to give you unequalled performance—with minimum maintenance and a high degree of operating economy.

In the areas of completely automatic stove changing and high-pressure furnace operations, the equipment shown here is typical of the advances in blast furnace technology constantly being sought by forward thinking Freyn engineers. For information on how Freyn equipment might improve *your* operations, write: **Freyn Department, Koppers Company, Inc., Pittsburgh 19, Pa.**



STATIC SWITCHING PANEL replaces relay sequencing control in many new and rebuilt installations. This type of control is completely static, without any interposing relays. Maintenance normally connected with relay contacts, coils and moving parts is eliminated in static switching.



MAGNETIC PANEL is required for final power output to amplify signals from static switching panel. These signals actuate the distributor motors, stockline recorder motors, and the breeze belt and vibrating screen motors. Magnetic amplifiers are utilized for control devices as solenoid valves.

Charging Control • Skip Hoist • Pneumatic Bell Hoist • Stockline Recorder • Automatic Stove Changing Equipment • Motor Drive Snort Valve Operator • Pneumatic Sludge Ejector • High Pressure Equipment • Stove Burners • Stove Valves.

KOPPERS

KOPPERS

FREYN DEPARTMENT

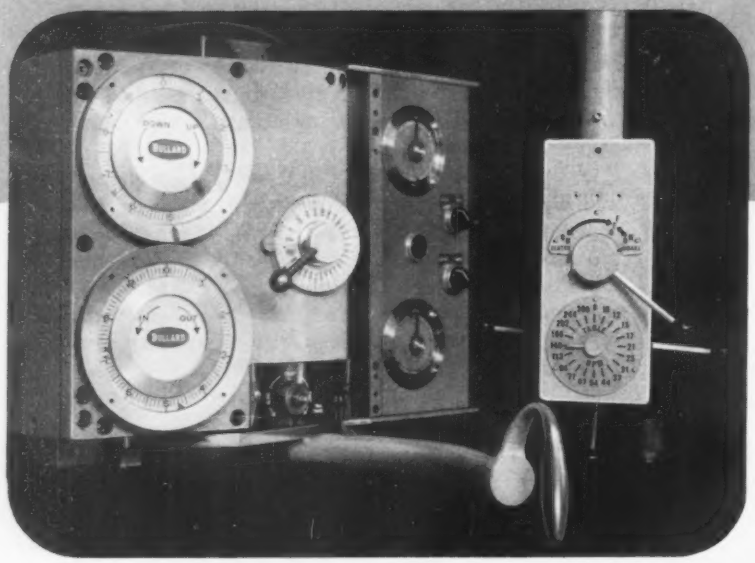
. . . Another **First** from **BULLARD**

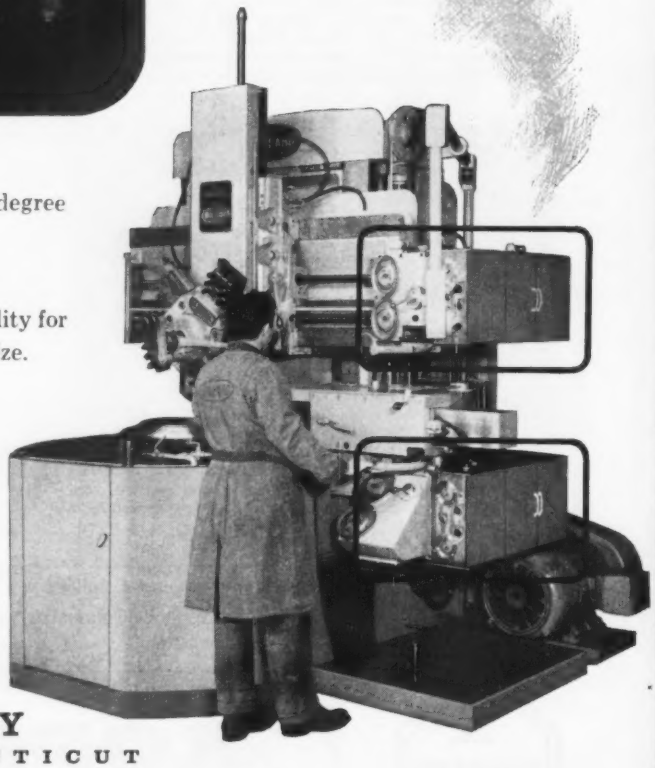
Size-Au-Trol*

revolutionary new feature of

Bullard DYNATROL*

VERTICAL TURRET LATHES





Size-Au-Trol*
provides precise tool positioning control to a degree unobtainable with other vertical turret lathes.

Size-Au-Trol*
after set-up relieves the operator of the responsibility for sizing the work by insuring consistent control of size.

Size-Au-Trol*
repetitively accurate to within .0003, increases productivity by cutting time between cuts.

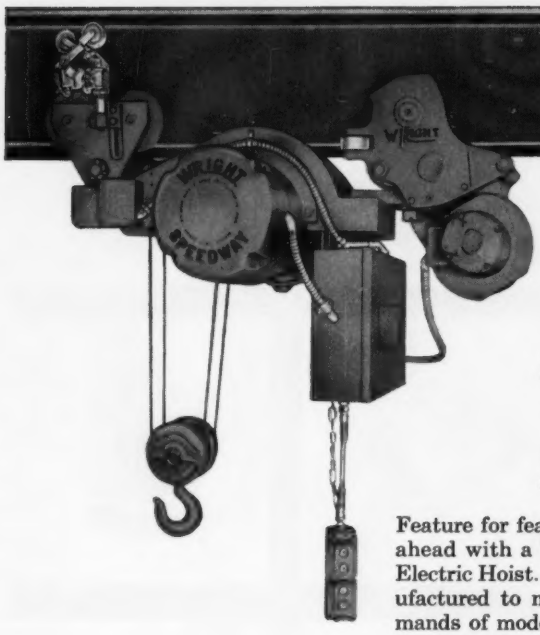
Size-Au-Trol*
is standard equipment on the complete line of Bullard Dynatrol V.T.L.'s.

For information on the completely new Dynatrol* line of vertical turret lathes, contact your nearest Bullard Sales Representative or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

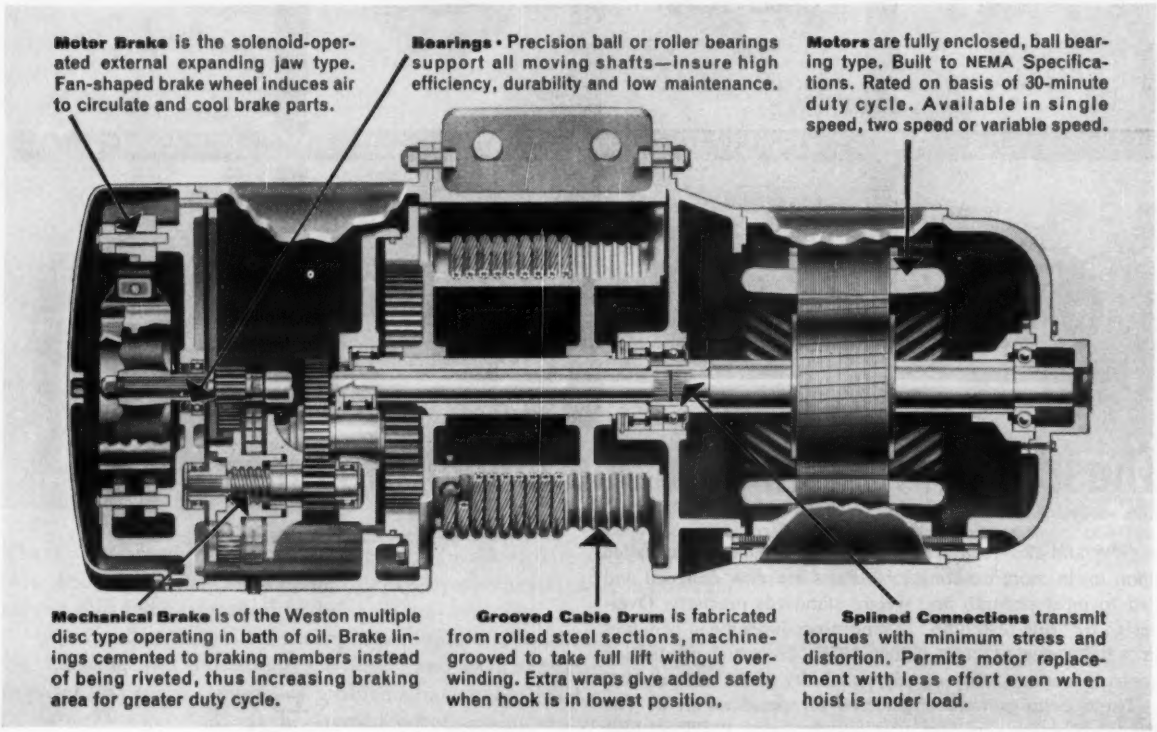
*Trademark

. . . YOU CAN'T BEAT A BULLARD . . .



You Can't Buy a Low-Priced Hoist with the Outstanding Performance and Maintenance Features You Get as Standard Equipment from Wright

Feature for feature, you are years ahead with a WRIGHT *Speedway* Electric Hoist. Designed and manufactured to meet the varied demands of modern high speed production, *Speedway* Hoists give you the safety, adaptability, ruggedness and efficiency which you can't get in a low-priced hoist. Many of these performance and maintenance features are exclusive with WRIGHT. So if you are considering the purchase of an electric hoist, it will pay you to investigate the advantages of WRIGHT *Speedway* Hoists. For complete information, write our York, Pa., headquarters for **Catalog E-58.**


Motor Brake is the solenoid-operated external expanding jaw type. Fan-shaped brake wheel induces air to circulate and cool brake parts.
Bearings • Precision ball or roller bearings support all moving shafts—insure high efficiency, durability and low maintenance.
Motors are fully enclosed, ball bearing type. Built to NEMA Specifications. Rated on basis of 30-minute duty cycle. Available in single speed, two speed or variable speed.
Mechanical Brake is of the Weston multiple disc type operating in bath of oil. Brake linings cemented to braking members instead of being riveted, thus increasing braking area for greater duty cycle.
Grooved Cable Drum is fabricated from rolled steel sections, machine-grooved to take full lift without overwinding. Extra wraps give added safety when hook is in lowest position.
Splined Connections transmit torques with minimum stress and distortion. Permits motor replacement with less effort even when hoist is under load.

WRIGHT HOISTS

Wright Hoist Division · American Chain & Cable Company, Inc.

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO

These sound castings made sound products

Gray and alloyed iron castings are continually being called upon to do more exacting jobs. Parts are now designed and cast to meet strength and weight standards precisely. Over-design or "rule-of-thumb" casting procedures mean penalties in weight, size or cost. Under-design or casual production controls reduce quality and dependability of the end product.

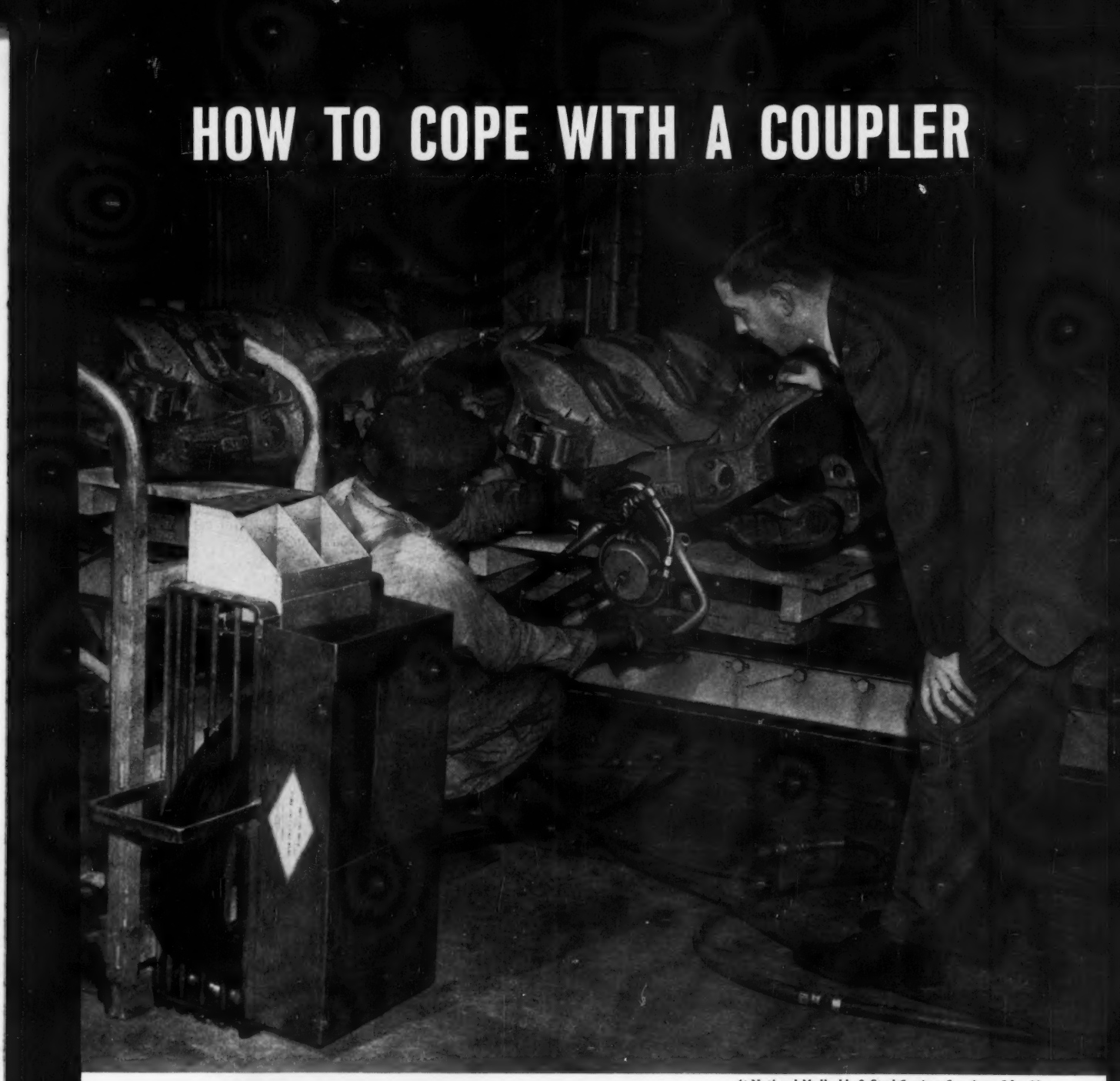
These castings were engineered to specifications at The Decatur Casting Company where high quality standards govern every step of the production process. Heat treating, when required, was done in our own furnace. The customers ordered castings to specification—and got what they ordered in every casting.

Decatur Quality Castings® are supplied in weights from a few ounces to 100 pounds. We suggest you consult us on your next casting requirements.

THE DECATUR CASTING CO.

Light Gray Iron and Alloyed Iron Castings
Decatur, Indiana Phone: Decatur 3-2700

HOW TO COPE WITH A COUPLER



At National Malleable & Steel Castings Co., Acme Idea Man Gene Fairbank views Idea No. U6-36 which he helped develop.

These AAR Standard E-60 couplers used to be a king-size shipping problem. Previously, they were loaded singly, by overhead crane, in gondola cars—unloaded painstakingly the same way.

Now, with Acme Steel Strapping, couplers are palletized in lots of six. Loading and unloading are faster, and easier. Storage is simpler, requires less space. Inventory problems have been eased.

There's a good chance that Acme Steel Strapping can profitably solve a materials handling challenge for you. Let your experienced Acme Idea Man study your problem. Or, for more facts, mail the coupon.

ACME STEEL

IDEA LEADER IN STRAPPING

ACME STEEL COMPANY
Acme Steel Products Division
Dept. SBS-50
135th St. & Perry Ave.,
Chicago 27, Ill.

Please send me Idea No. U6-36 and examples of how major companies in my field use Acme Steel Strapping.

*Name*_____

*Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

NATIONAL ACME'S
"ZONE OF RESPONSIBILITY"
INCLUDES ALL PHASES
OF COST REDUCTION

Check YOURS...Then Check National Acme

Direct Costs: these include direct dollar savings as realized by Minneapolis Honeywell . . . an "every day" job for Acme-Gridleys.

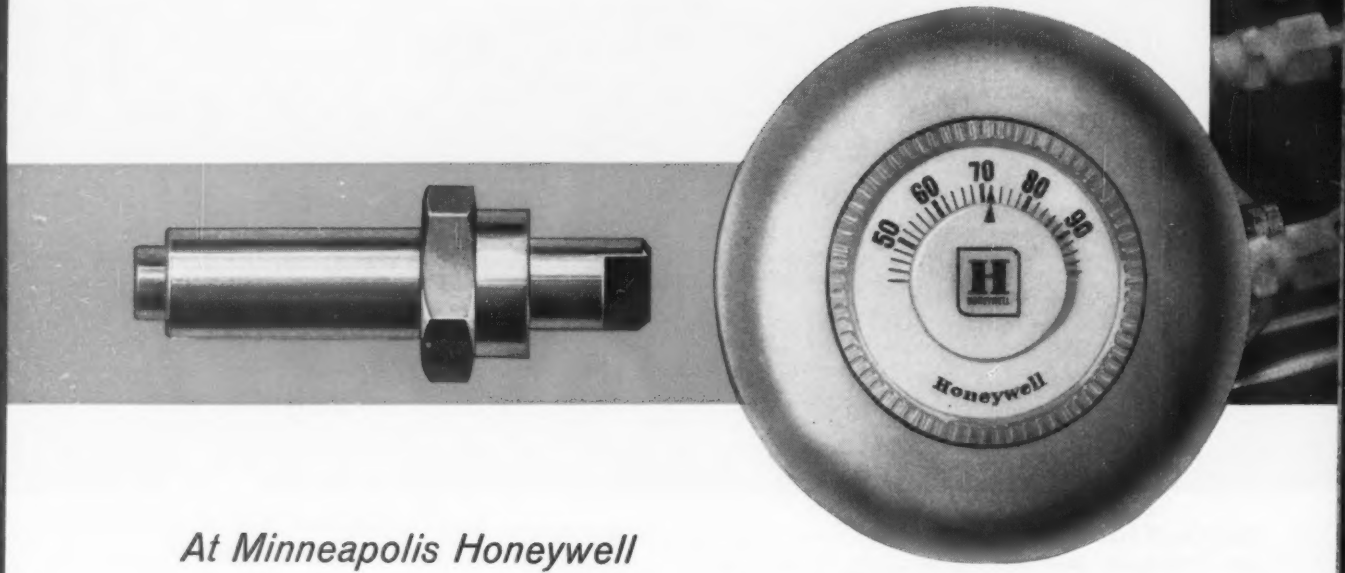
Indirect Costs: effecting important savings in maintenance, downtime, scrap reduction, tool costs, etc.

Product Redesign: teaming with your design group to take full advantage of Acme-Gridleys' cost reducing capabilities.

Direct Material Costs: our engineers provide important savings in this area by constantly matching machines and tools to modern metallurgical problems.

Make-or-Buy Reviews: in many cases our Contract Division can assume your production headaches and relieve you of immediate capital investment.

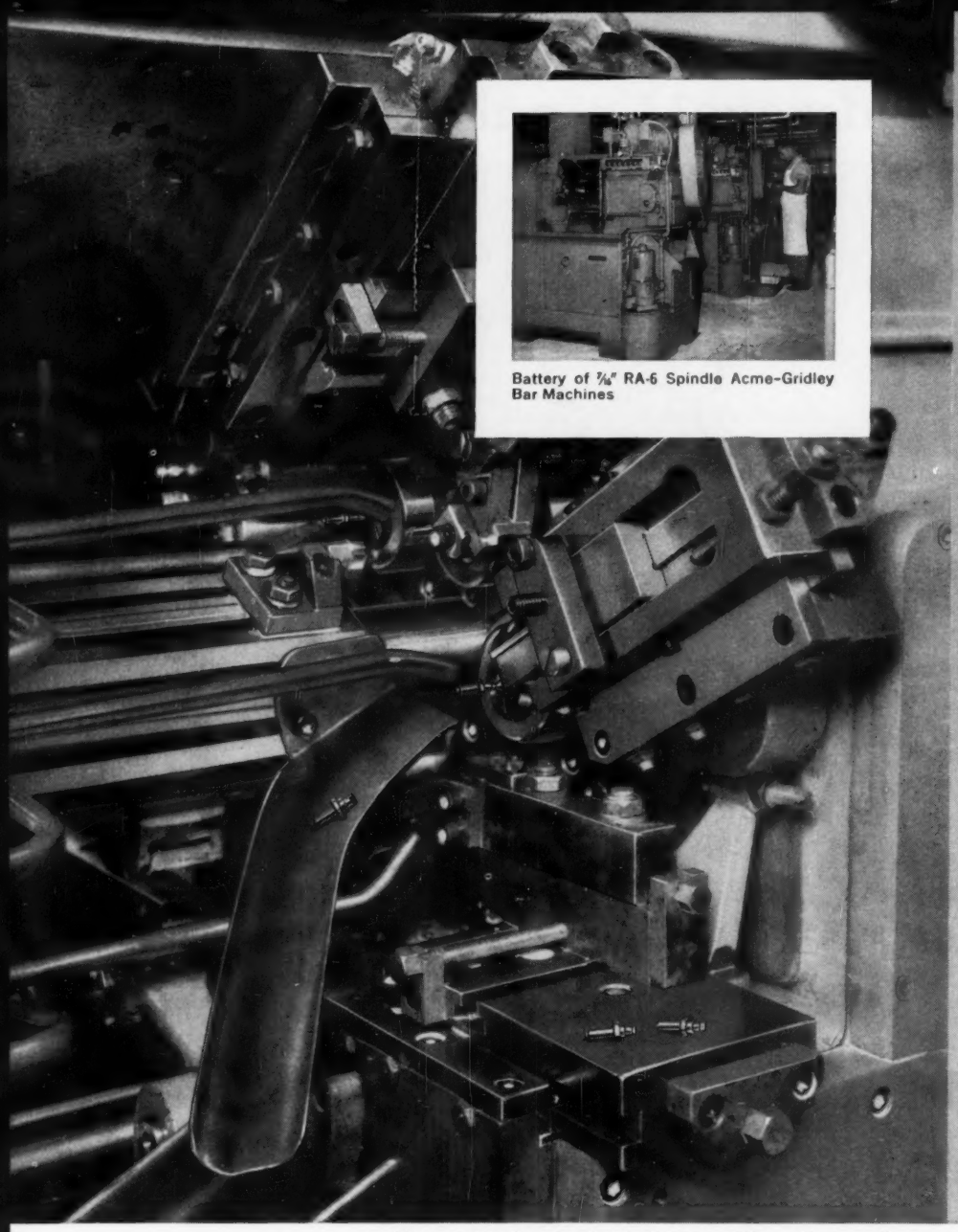
Spot Modernization: pioneering in modern tooling methods, and the flexibility of Acme-Gridleys can provide many "on-the-spot" savings.



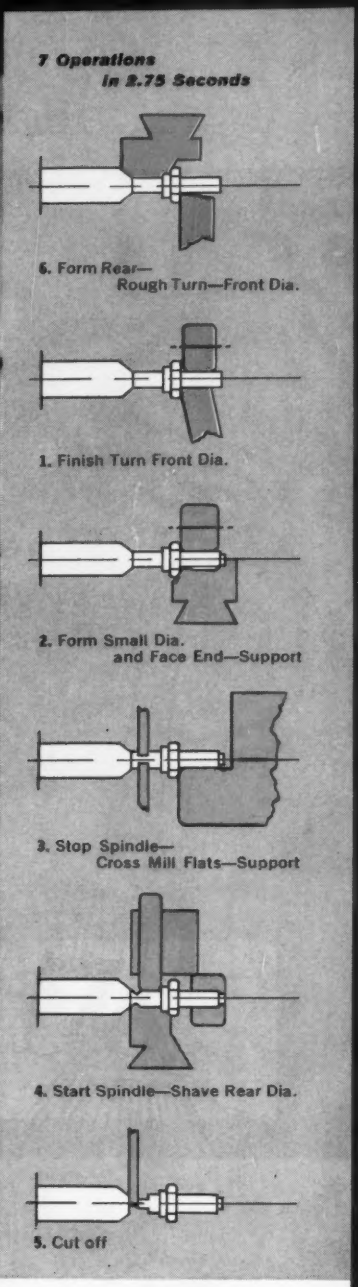
At Minneapolis Honeywell

ONE ACME-GRIDLEY REPLACES FIVE SINGLE SPINDLE MACHINES

. . . Saves 80% in Machine Hours



Battery of 7/8" RA-6 Spindle Acme-Gridley Bar Machines

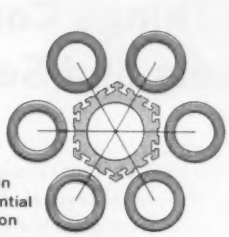


Close up of tooling zone showing 3rd, 4th and 5th position operations

. . . *in addition* the reject rate is reduced 83% and operator hours per thousand slashed 92% in the production of a precision center post component for residential thermostats. What's more, with one machine, one set of tools, and one operator doing all machining in the primary setup, quality control is greatly simplified, and valuable floor space saved. Still further savings result from greatly reduced machine maintenance.

Such drastic savings are possible for Minneapolis Honeywell because of inherent Acme-Gridley features such as independently operated tool slides, the extreme accuracy and flexibility of direct camming, and wide open tooling zones. Rugged and versatile 7/16" Acme-Gridleys fit right in with Honeywell's program of "Total Machine Utilization"; will pay off for years to come by economically accommodating the materials and setups Honeywell requires in the production of small, high quality parts for their precision instruments.

Get the complete story on how Acme-Gridley Automatics provide industry's most modern approach to cost reduction. Call, write or wire.



Pioneer in
Circumferential
Automation

National Acme

The National Acme Company
187 E. 131st Street
Cleveland 8, Ohio

Sales Offices: Newark 2, N. J.; Chicago 6, Ill.; Detroit 27, Mich.

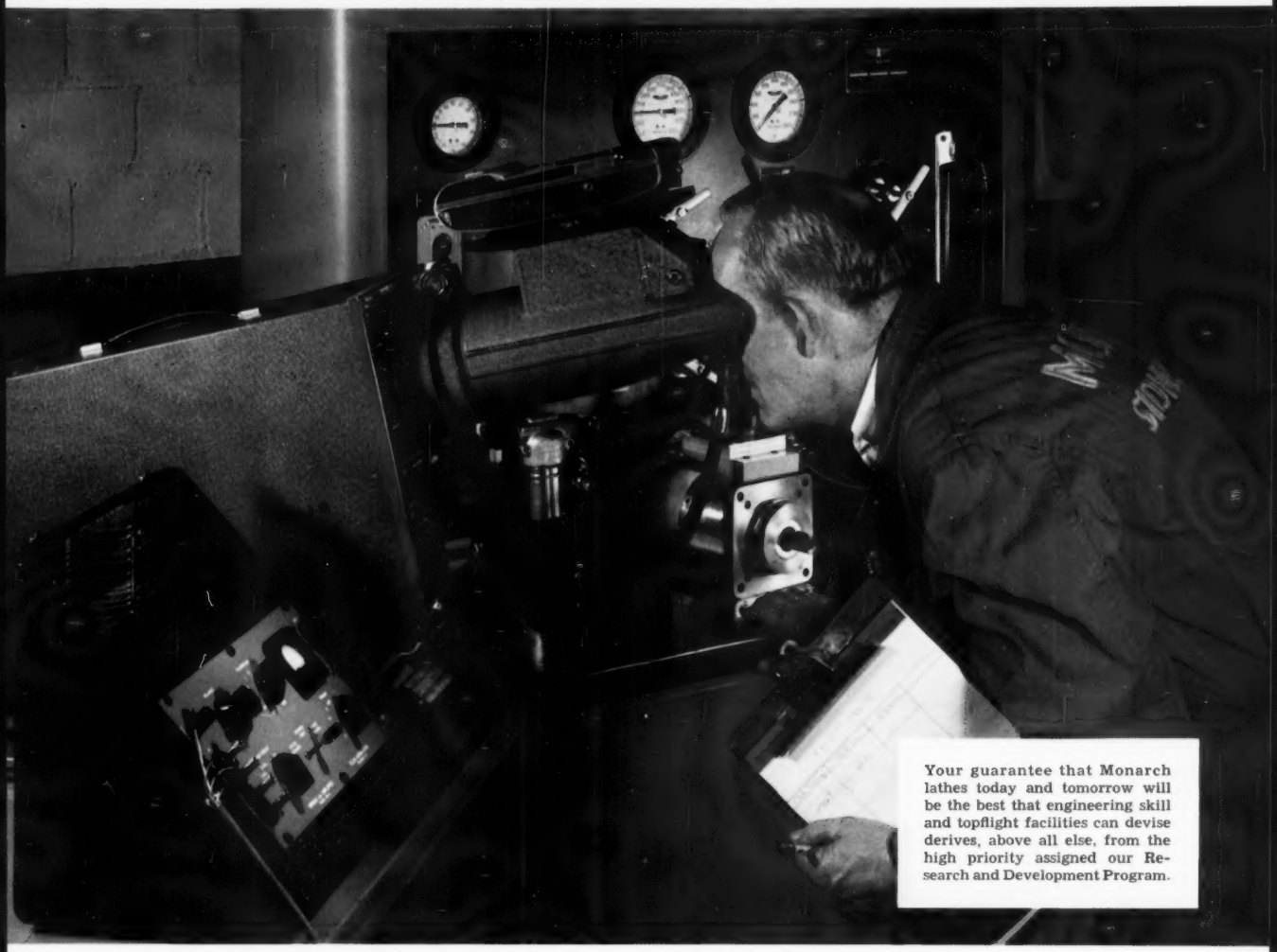
"All Things Considered, You Can't Beat Sharon Steels and Service"

—DAVID H. PARKER, Assistant Foreman Sheet Metal
Saybrook Plant, True Temper Corporation

"At True Temper we make hundreds of different items for gardeners, craftsmen and sportsmen," says David H. Parker, assistant foreman, sheet metal. "Because of this we buy many different steels—from plain hot rolled carbon to special analysis stainless. We buy from several different steel producers, so I speak from experience when I say some of the finest quality steel I have used in my 20 years in the metalworking business has come from the *Sharon Steel Corporation, Sharon, Pa.*"

SHARONSTEEL **SHARON** *Quality* **STEEL**

He's making a Monarch Lathe...



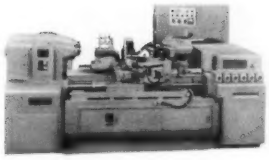
Your guarantee that Monarch lathes today and tomorrow will be the best that engineering skill and topflight facilities can devise derives, above all else, from the high priority assigned our Research and Development Program.

One example of where the extra values come from—in your MONARCH Lathes

Gauging lathe values is as important to you as gauging lathe quality is to us—same coin, both sides. Spending the fewest dollars on a machine tool is far from getting the biggest dollar's worth, of course.

Witness this hydraulic motor check, one of the thousands of checks and tests conducted each year in our Research and Development Laboratory to meet our unique research, development and quality control objectives. Or should we say "our goals of higher productivity, greater accuracy and optimum dollar value to the user?" Same thing.

It is in the sum total of many procedures like these in both engineering and manufacturing, many exclusive with us, that you find the true value of the Monarch Lathe. And that can be concretely expressed this way: *in our Turning Clinic today —using your parts—we can demonstrate Monarch lathes that will increase production, reduce or eliminate finishing, lengthen tool life.* Isn't performance like that the ultimate bargain? Write: THE MONARCH MACHINE TOOL CO., SIDNEY, OHIO.

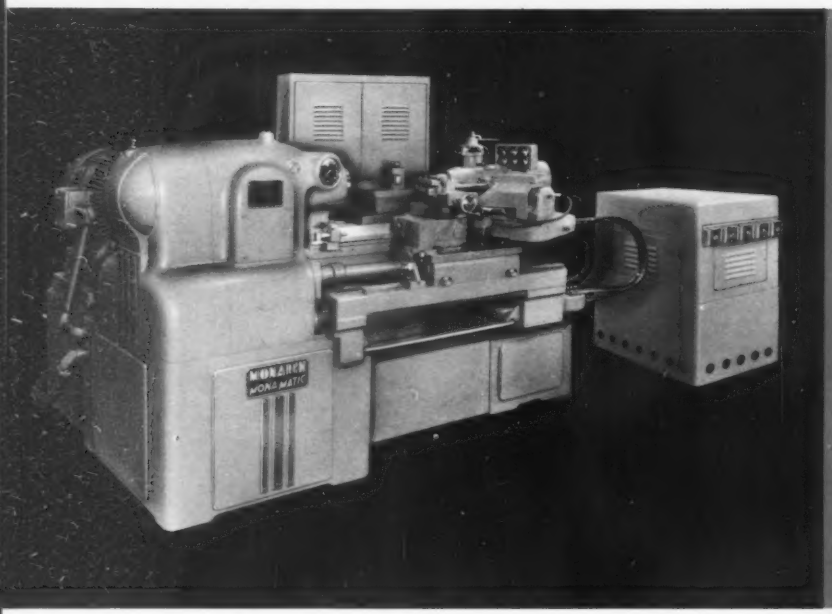


WHEN YOU BUY VALUE
MONARCHS COST LESS

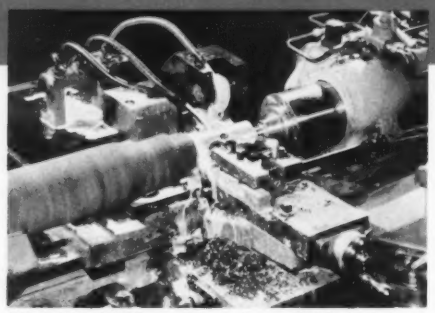
Monarch
TURNING MACHINES

VISIT MONARCH—*We'll turn your part to return you profit*

Don't Tool Up for Tomorrow's Boom with Yesterday's Lathes



MONARCH'S HIGH PRODUCTION LATHES OF TOMORROW...



Model 20-H Mona-Matic is available in 18", 30" and 42" center distance. Swing over bed is 15"; over front slide and rear slide ways, 8". Bed ways are flame hardened and ground.

4.. The New Model 20-H Mona-Matic—A Low First Cost Production Lathe

Take a good look at what we've done to the Mona-Matic concept of production turning. This new machine

(1) *Carries a low price tag, because of simplified design*

(2) *Has fast hydraulic feed and traverse movements, making it exceedingly productive*

(3) *Is a dependable day after day performer, requiring only routine maintenance for years of trouble-free service*

The Model 20-H is a fully automatic double carriage turning machine, with a 60° "Air-Gage Tracer" controlled front tool slide. A variety of automatic cycling arrangements provides high productiveness and versatility. Eight spindle speeds are available by pick-off gears in each of three standard ranges. The tailstock has an air actuated spindle and inbuilt, heavy duty, anti-friction center.

Front carriage feed rate is infinitely variable from 1" to 40" per minute; traverse is 200" per minute. Rear slide feed rate is ½" to 40" per minute while traverse is at 90" per minute.

Four different feeds are available to the carriage. Either a one or a two cut cycle can be furnished. Two cut cycle machines are provided with a selector switch for one or two cut operation.

Imagine better performance at lower cost these days! Why not let us set up a demonstration on your parts? *The Monarch Machine Tool Company*, Sidney, Ohio.

Monarch
TURNING MACHINES

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER

Stove pads place easier with heat-resistant concrete

Heat-resistant concrete in foundation pads is just one use of concrete made with LUMNITE calcium-aluminate cement and aggregates in blast furnace stoves. Because it resists heat and abrasion, concrete made with LUMNITE cement can also be used to line sections connecting to hot-blast mains as well as flues, doors and stacks. In addition, it can be used as dome and wall insulation. And precast shapes can be formed, for doors and manholes. Installation is fast, easy, economical—by guniting, pouring or plastering. Concrete reaches full strength in 24 hours.

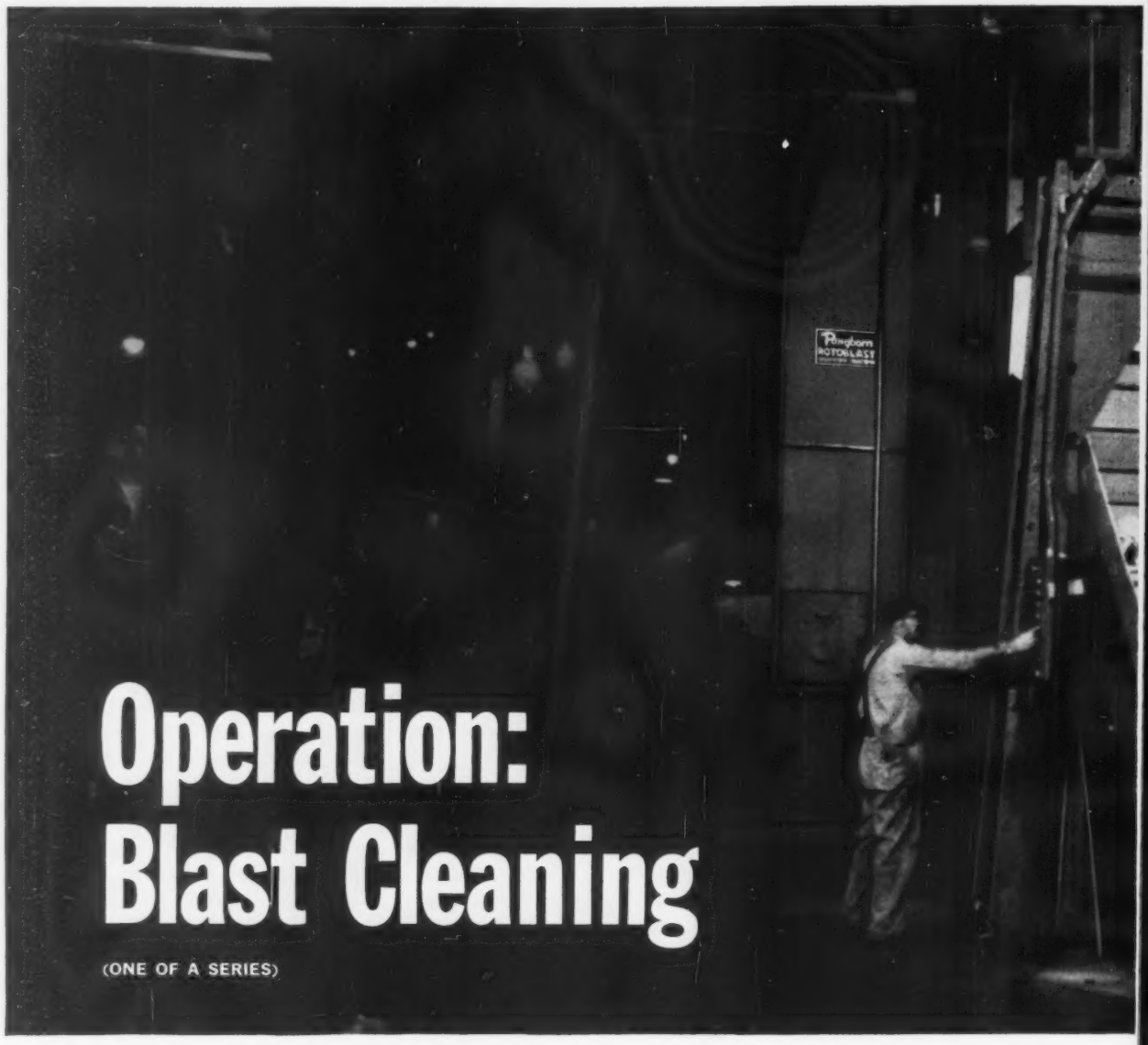
Write for detailed information on aggregates, proportions and methods of making concrete with LUMNITE cement: Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

L-208

"USS," "Atlas" and "Lumnite" are registered trademarks

Universal Atlas Cement
Division of
United States Steel

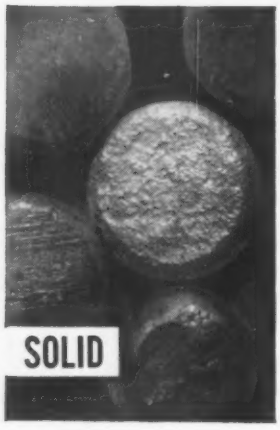
Offices: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco



Operation: Blast Cleaning

(ONE OF A SERIES)

Pangborn Rotoblast proves itself again



Carrier Corporation, Syracuse, N.Y.—Pangborn Rotoblast cleans so quickly it has cut cleaning department labor costs 30% to 40% . . . saving $15,000 a year.

Master Electric Company, Dayton, Ohio—Two 12 cu. ft. Rotoblast Barrels with automation reduce labor costs by 50%—save $15,000 a year in manpower alone! Clean 33 tons of gray iron castings a day with ease.

Meadville Malleable Iron Co., Meadville, Pa.—Pangborn Roto-

And Rotoblast Steel Abrasives

In foundries, forges, steel and metal working plants all over America, premium quality Rotoblast Steel Shot and Grit are replacing other metal abrasives as they *prove* their ability to blast clean at lower cost. Lansing Drop Forge Co.—a typical

Typical Rotoblast Barrel, Ft. Pitt Steel Castings Co., McKeesport, Pa.

...and again...and again...and again!

blast cut 24 man-hours daily to 15 . . . cleans loads three times as large in half the time.

Ingersoll Rand Co., Painted Post, N.Y.—Pangborn Rotoblast cleans 74,000 lbs. of castings per day, cuts cleaning time in half and substantially reduces costs.

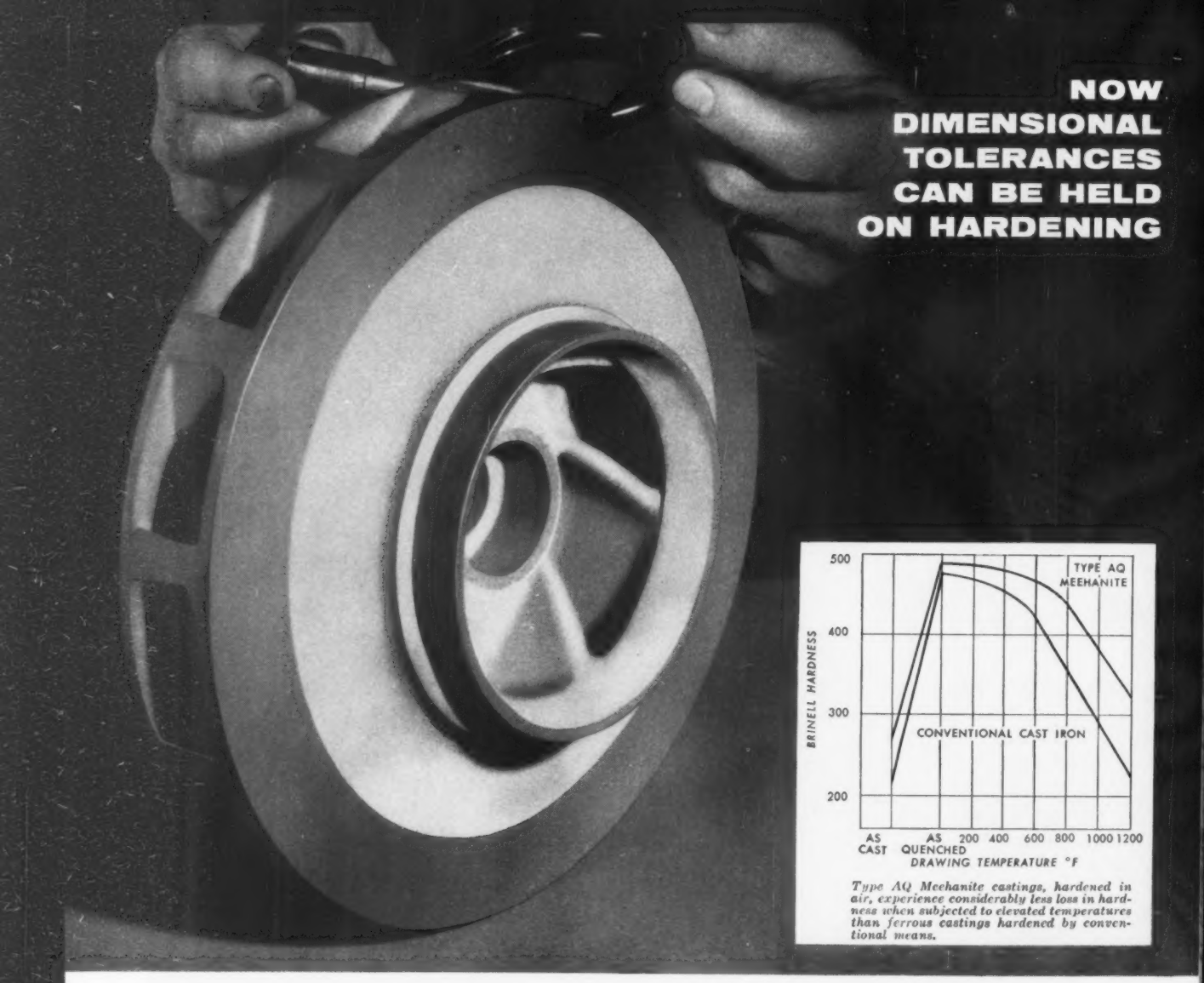
Buckeye Iron & Brass Co., Dayton, Ohio—Pangborn Rotoblast is automated to reduce labor requirements even further, cuts 15 minutes blast time to just 4½.

Results like these explain why two of the world's leading automotive manufacturers have just ordered *nine* 32 cu. ft. capacity Rotoblast Barrels! If your problem involves blast cleaning, talk to your Pangborn man or write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning, Vibratory, Dust Control Equipment—Rotoblast® Steel Shot and Grit.*®

prove their value, too!

user—switched to Rotoblast S-390, cut abrasive cost by 23%. An Ohio foundry cut shot consumption from 27 lbs. per wheel hour to 7.8 lbs. with Rotoblast S-330. Let us show you what Rotoblast abrasives will do for you.

Pangborn
OF HAGERSTOWN



NOW DIMENSIONAL TOLERANCES CAN BE HELD ON HARDENING

Type AQ Meehanite castings, hardened in air, experience considerably less loss in hardness when subjected to elevated temperatures than ferrous castings hardened by conventional means.

NEW AQ MEEHANITE® . . . keeps distortion to a minimum

AQ Meehanite® is a tough, wear and abrasion resisting material which can be cast to a machinable hardness and air hardened after machining to high Brinell values with little or no distortion, even in massive castings. An outstanding advantage of this new metal is its ability to be locally hardened for improved wear resistance. As no water quenching is required, internal stress is reduced and dimensional tolerances can be held closely. This is particularly important for such parts as dies, punches, cams, rollers, etc.

Type AQ Meehanite is ideally suited for hot forming dies and other parts required to work at elevated temperatures because it maintains its high hardness even when heated. For this reason, AQ Meehanite castings can be expected to provide good wear resistance where conventional flame hardened parts may soften under repeated temperature influence. See chart above. Large castings can be fully hardened . . . simply . . . economically . . . without oil bath equipment . . . and without dangerous distortions.

Free literature is available on AQ Meehanite. Write to the Meehanite Metal Corporation or contact the nearest Meehanite foundry.

You'll like doing business with a Meehanite foundry.

MEEHANITE METAL

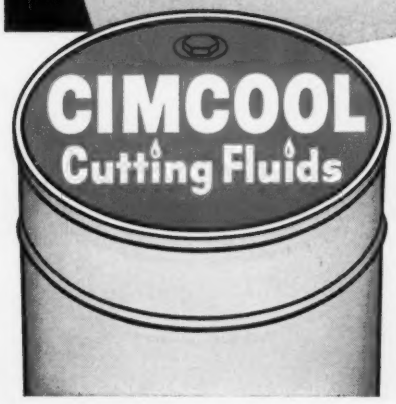
The American Laundry Machinery Co., Rochester, N. Y.
Atlas Foundry Co., Detroit, Mich.
Banner Iron Works, St. Louis, Mo.
Barnett Foundry & Machine Co., Irvington, N. J.
Casting Service Corp., LaPorte, Indiana and Bridgman, Michigan
Centrifugally Cast Products Div., The Shenango Furnace Co., Dover, Ohio
Compton Foundry, Compton, Calif.
The Cooper-Bessemer Corp., Mt. Vernon, Ohio and Grove City, Pa.
Crawford & Doherty Foundry Co., Portland, Ore.
Dayton Casting Co., Dayton, Ohio
Empire Foundry Co., Tulsa, Okla.
Florence Pipe Foundry & Machine Co., Florence, N. J.
Fulton Foundry & Machines Co., Inc., Cleveland, Ohio
General Foundry & Mfg., Flint, Mich.
Georgia Iron Works, Augusta, Ga.
Greenlee Foundries, Inc., Chicago, Ill.
Hamilton Foundry Inc., Hamilton, Ohio
Johnstone Foundries, Inc., Grove City, Pa.
Kanawha Manufacturing Co., Charleston, W. Va.
Kennedy Van Saun Mfg. & Eng. Corp., Danville, Pa.
Lincoln Foundry Corp., Los Angeles, Calif.
Oil City Iron Works, Corsicana, Texas
Palmyra Foundry Co., Inc., Palmyra, N. J.
The Henry Perkins Co., Bridgewater, Mass.
Pohlman Foundry Co., Inc., Buffalo, N. Y.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sonith Foundries of FMC, Indianapolis, Ind.
Standard Foundry Co., Worcester, Mass.
The Stearns-Roger Mfg. Co., Denver, Colo.
Vulcan Foundry Co., Oakland, Calif.
Washington Iron Works, Seattle, Wash.
Dorr-Oliver-Long, Ltd., Orillia, Ontario
Hartley Foundry Div., London Concrete Machinery Co., Ltd., Brantford, Ontario
Otis Elevator Co., Ltd., Hamilton, Ontario

MEEHANITE METAL CORPORATION, NEW ROCHELLE, NEW YORK

Heavy-Duty Improvement!

New chemical cutting fluid CIMPERIAL scores another success as a replacement to a cutting oil, in a heavy duty application. (Company name on request)

SALES REPORT
2.
on automatic screw machines. The operation was turning of stainless steel automotive water pump shafts. They were getting a lot of smoke and spray with a straight cutting oil.
We installed Cimperial at a 1:20 dilution. The result was an excellent job with no smoke and the work area much cleaner. No more slippery floor either. Cimperial left the parts so clean that an entire washing operation was eliminated.
Norm Schucht
Cincinnati Office



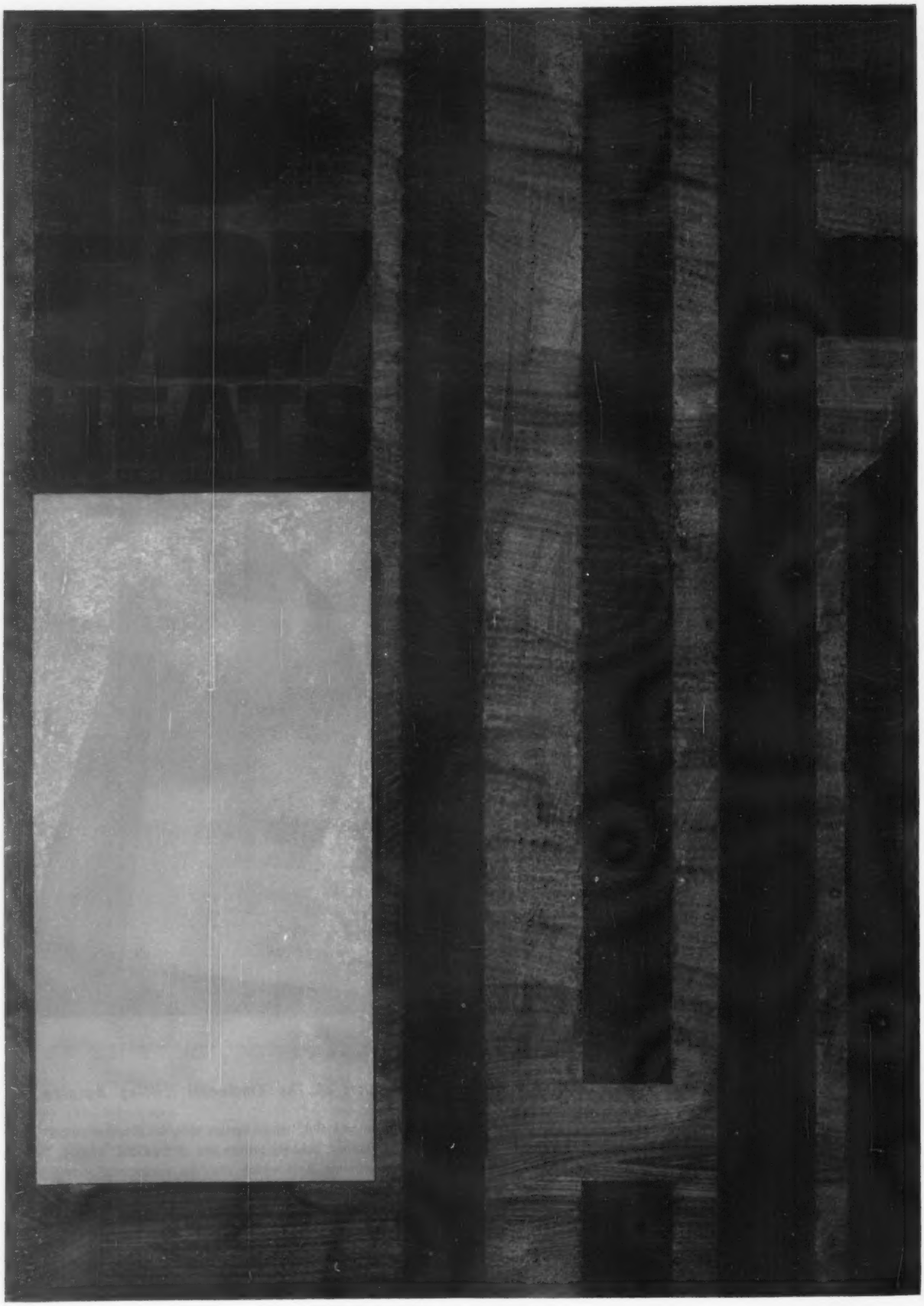
FOR 100% OF ALL METAL CUTTING JOBS

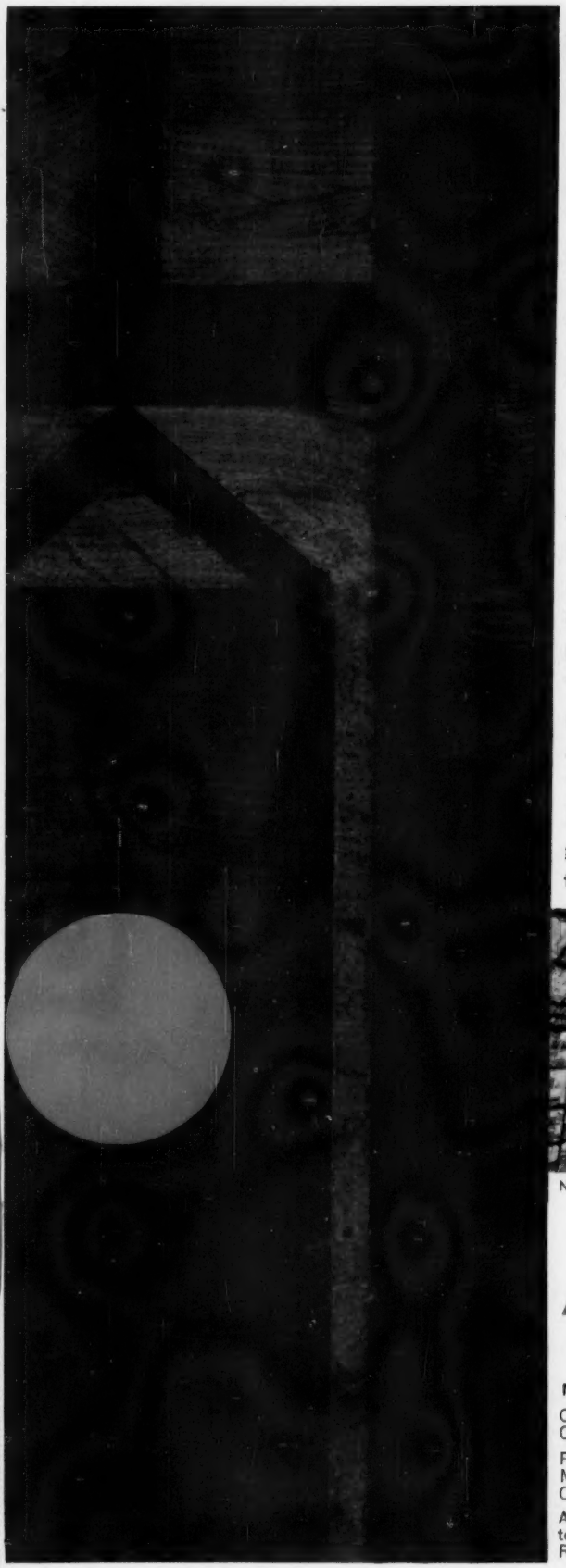
Production-proved products of The Cincinnati Milling Machine Co.

CIMCOOL 52 Concentrate — The pink fluid which covers 85% of all metal cutting jobs.
CIMPERIAL° — Newest in the famous, industry-proven line of CIMCOOL° Cutting Fluids.
CIMPLUS — The transparent grinding fluid which provides exceptional rust control.
CIMCUT Concentrates (AA, NC, SS) — For every job requiring an oil-base cutting fluid.
ALSO — CIMCOOL Tapping Compound — CIMCOOL Bactericide — CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

°Trade Marks Reg. U. S. Pat. Off.





. . . . ANOTHER RECORD FOR FOUNDRY OPEN HEARTH BOTTOM PERFORMANCE USING PERMANENTE 165 RAMMING MIX

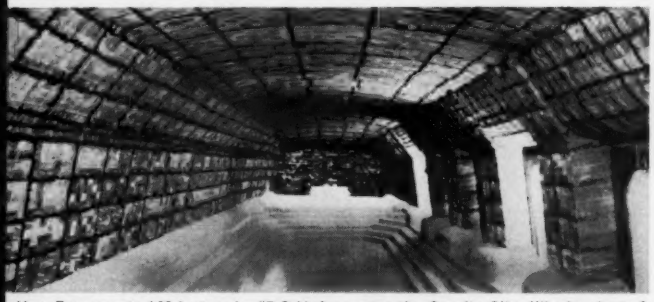
This outstanding performance record was recently established in the #7 furnace at General Steel Castings after switching to Permanente 165 for the foundry open hearth furnace bottom. The heats average 50–60 tons in the 80-ton capacity furnace. Normal fettling time is 20 minutes.

The furnace normally makes three types of steel: armor grade, Grade "A" (1020 steel) and nickel. With the Permanente 165 bottom, one type is made right after another without notable pickup of undesirable elements.

EXCEPTIONAL PERFORMANCE IS THE RULE

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for furnace bottoms, for new tapholes or for hot tapholes. Permanente 165 is made from high purity Kaiser Periclase refractory grains (95–96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature—providing fast furnace availability.

This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life. Make your own test and see how much more service you get with Permanente 165 Ramming Mix. Your Kaiser Refractories representative will be glad to help.



New Permanente 165 bottom in #7 O.H. furnace at the Granite City, Illinois, plant of General Steel Castings Corporation.

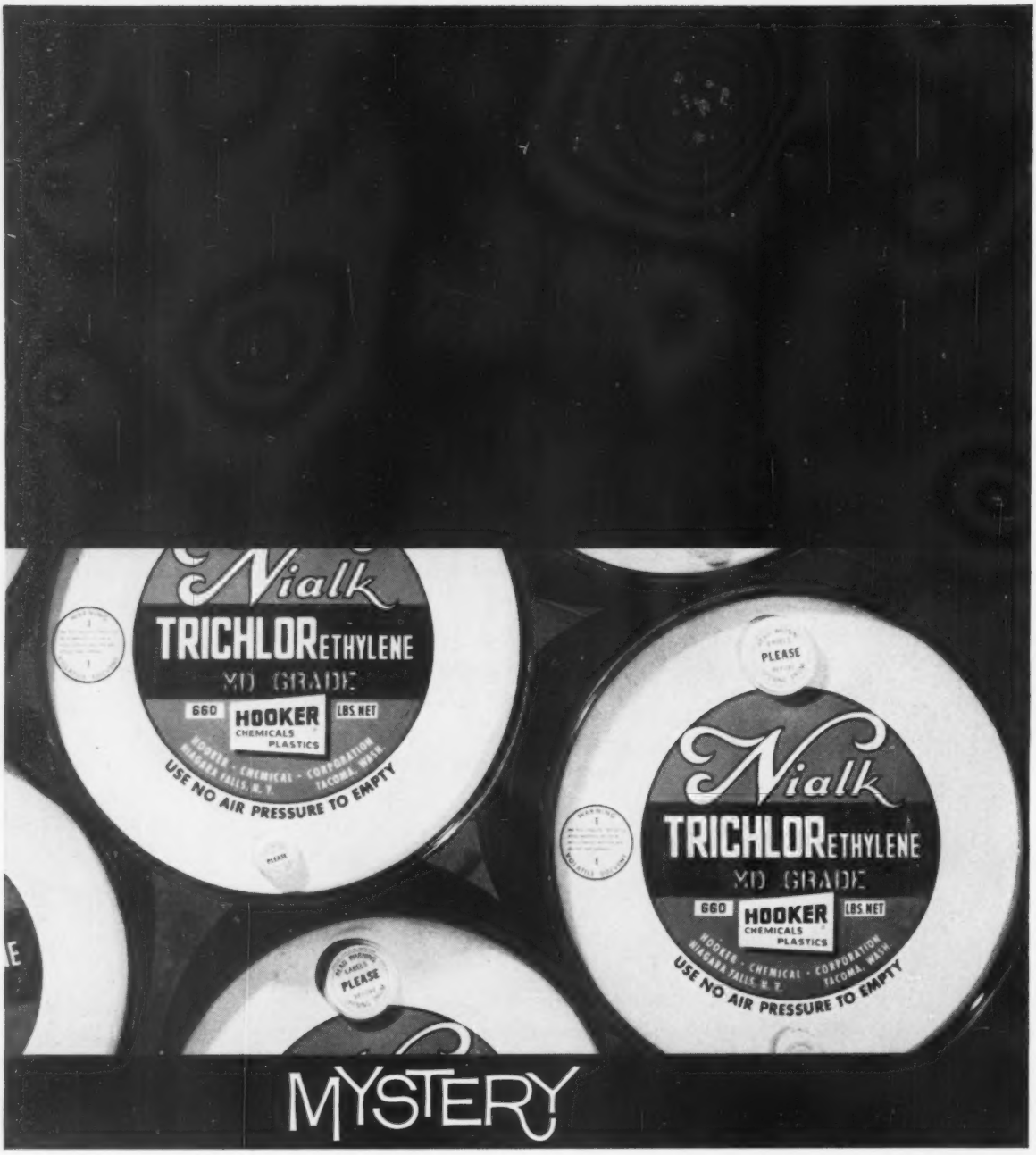
KAISER REFRACTORIES

Mexico Refractories Company Now Merged with Kaiser Refractories

Call or write Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc., at any of the offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
MEXICO, MISSOURI . . . . . Mex-R-Co Building
OAKLAND 12, CALIF. . . . . 300 Lakeside Drive

Ask to see the 30-minute color movie, "Progress in Modern Basic Refractories." Arrangements will be made by your Kaiser Refractories Sales Representative or Regional Office.



HOW ONE GRADE DOES TWO JOBS

Nialk® MD Grade Trichlorethylene is pure enough for flushing missile components and low enough in cost for degreasing. That's because we've made it non-impact sensitive in the presence of liquid oxygen and because we've held residue on evaporation to 0.0005% max.

Because one and not two grades is needed, you cut your inventory, lower your costs, avoid mistakes.

Another thing that makes Nialk Trichlorethylene so good is PSP (permanent staying power). A neutral stabilizer system protects against heat, air, light, moisture, acids and active metals. It can't wear out, doesn't let your solvent go sour.

If you would like complete information on Nialk Trichlorethylene, ask for Bulletin 44A and Data Sheet 814. Meanwhile, why not try a few drums (or a tank car) of Nialk brand. You will find that your trichlor dollars buy more at Hooker.

Nialk® Trichlor, a product of

HOOKER CHEMICAL CORPORATION

1205 Union Street, Niagara Falls, N. Y.

Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER CHEMICALS PLASTICS

QUALITY

begins with

KEYSTONE WIRE

GARDNER WIRE CO.

of Chicago manufactures millions of wire springs for such diverse industries as home appliances, controls, automobiles and toys.

For 20 years Gardner has used Keystone MB Spring Wire on such applications as the cord protector spring illustrated above. This particular spring has five different dimensions—each must be held to tolerances of ±.0005". Special cams to make this part are hand ground. Control of dimensions in a spring wire, especially a wire with superior performance characteristics like Keystone's MB, builds a better end product and allows faster runs at lower cost. Production interruptions are virtually eliminated. Keystone product uniformity also assures spring makers that their product will perform exactly as calculated over a long life. Keystone MB is shipped clean—takes plating reliably.

Your Keystone representative is a wire specialist. Consult him for the correct wire to improve your product and your reputation for quality.

Hundreds of spring sizes and shapes are produced at Gardner from Keystone MB Spring Wire.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

Popular 5040T now available with...

Detachable - TORQUE CONTROL BARS

make this a one-tool assembly line...

Size 5040TD
AIR IMPACTOOL
An I-R Exclusive

Ingersoll-Rand's reliable, job-proved, built-in torsion bar torque control Impactools have paved the way for these new *Detachable* torsion bars. The popular 5040T Impactool is also available as the 5040TD, an ideal tool where limited production does not warrant the cost of several Impactools with built-in torsion bars.

Here's the economical answer to better quality control on fastening jobs that require different torques for the various nuts or cap screws. Now you can have a series of detachable bars, preset to the specific torques you require.

For example: slip on the 40 ft. lb. bar and run those three nuts—slip it off—put on the 50 ft. lb. bar and run the six cap screws—next the 30 ft. lb. bar, and so on. The Impactool shuts off automatically at each preset torque—quality control at its best.

How do you get it? Order a new Size 5040TD Impactool which has the built-in automatic shut-off device that is actuated by the preset torque control torsion bar. Then order as many torsion bars as you need. You can set the torque yourself with a vise and a wrench.

The Heavy-Duty bar is adjustable from 45 to 90 ft. lbs. The Light bar provides torques from 20 to 50 ft. lbs.

Don't wait; phone or write today for a demonstration or a copy of Form 5298.

Ingersoll-Rand
11 Broadway, New York 4, N. Y.
Planned Annual Retooling increases output per man

36A-8

STEEL
The Metalworking Weekly

Metalworking Week®

May 23, 1960

Three Steel Chiefs Are Optimistic

Charles M. White
Republic chairman

A. S. Glossbrenner
YS&T president

Logan T. Johnston
Armco president

"We see the decline in orders . . . bottoming out: Our third quarter business should show improvement in orders and production, and our fourth quarter even further improvement," Mr. White told stockholders. Mr. Glossbrenner told STEEL that the steel industry's operating rate will average 75 to 80 per cent of capacity this year, with production of 115 million to 117 million tons of ingots. He says business the industry expected in the second quarter is being pushed over into the third period. As a result, he expects operations to stay above 65 per cent throughout the period. He expects a strong upsurge in the fourth quarter. There's not much likelihood of a price change before yearend, he told STEEL. Mr. Johnston predicts that the steel industry will spend about $1 billion annually in the next few years to boost efficiency and versatility. "Very little of the money will go to build additional capacity," he says. He thinks the steel industry will introduce at least twice as many new products in the next ten years as in any past decade.

System Speeds Data Transmission

This prototype of Avco Corp.'s new Comex 104, a high speed, communications system, is in operation at Westinghouse Electric Corp.'s Columbus, Ohio, appliance plant. It transmits shipping information to other Westinghouse facilities in one-tenth the time required by teletypewriter. It will send 1000 words over a telephone line in 1 minute. The system can be leased for $130 a month. The transistorized system will accept messages at 60 to 100 words per minute.

GE Manager Lists Computer Problems, Predicts Huge Gains

Eight of ten electronic computers sold ten years from now will be bought for applications unheard of today, predicts C. C. Lasher, general manager of General Electric Co.'s Computer Dept., Phoenix, Ariz. He said four problems must be solved: 1. Understanding and development of applications. 2. Mak-

Technical Outlook—Page 129 Market Outlook—Page 171

ing the computer easier to program. 3. Greater reliability. 4. Standardization of hardware and languages. He said the price of admission to the computer industry is well over $50 million.

Newest Structural Mill Debuts

At U. S. Steel's South Works, a mill attendant flicks a few switches to turn ingots into slabs, blooms, or billets in the company's new structural mill. A Westinghouse Prodac control system guides the ingots. An array of electronic instruments, heat sensing devices, and logic systems keeps the steel moving through the line till it emerges as a structural shape. For more details, see the May 30 issue of STEEL.

PAs Note Order Improvement

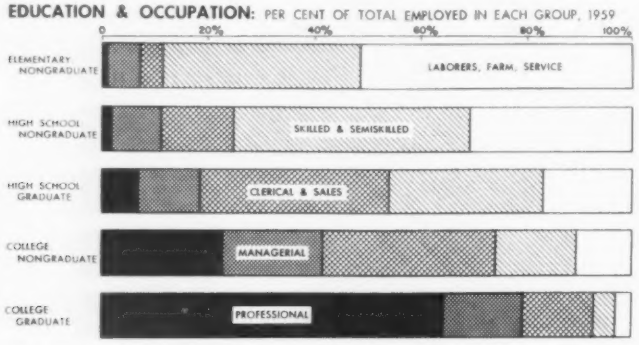
The latest survey (covering April) by the Purchasing Agents Association of Chicago finds: Order backlogs improved for the first time since December . . . profits are up slightly . . . salesmen are making "a more concerted effort to get business" . . . upward price pressures are beginning . . . inventory reduction continues . . . production is up significantly.

Reversal: U. S. Making Dies for Foreign Cars

Some 140 rough castings and partly finished (50 to 90 per cent) dies for the 1961 English Ford have been shipped to a Detroit tool and die firm for completion, says *Ward's Automotive Reports*. The delivery date is September. This marks a reversal of the trend to have dies made abroad for American cars.

How Education and Occupation Compare

This Conference Board chart shows what percentage of total employees in each class of labor are at the specified educational levels . . .



Professor Urges Depreciation Reform

R. M. Weidenhammer, professor of finance, University of Pittsburgh, told a National Industrial Conference Board meeting: U. S. manufacturers compete with foreign firms paying a tax of 30 per cent or less. Tariff protection would

only destroy the remaining export markets. The answer is a liberalization of depreciation allowances and a cut in the corporate profit tax from 52 per cent to 40 per cent. In today's economic competition, we must give our industries the weapons (incentives and cash flow) to fight back.

Have We Forgotten What Man Can Do?

Yes, charges Dr. Ward Edwards, research psychologist with the University of Michigan's Willow Run Engineering & Psychological Research Group. He says industry is failing to use man's inherent reliability, perception, judgment, and long term, rapid access, storage capability. He says designers should begin to center their work on the man—instead of just filling in with the man where the machine lets off.

When the Chairman Becomes Phone Salesman—Sales Soar

Maytag Co.'s top executives, headed by Chairman Fred Maytag II (photo) and President George Umbreit, manned a battery of 15 phones for three days to take appliance orders from field salesmen (who spent the three days and nights calling on dealers). "We exceeded our goal by one-third and are more convinced than ever that we're seeing an upturn in the appliance industry," beamed C. G. Ely, marketing vice president. Among the orders: An Alaskan bought a freezer.

Cross Co. Forced to Rehire Strikers

The National Labor Relations Board has ordered Cross Co., Detroit special machine builder, to bargain with the UAW and has suggested it re-employ UAW members even if it must lay off nonunion personnel to do so. Cross says it will absorb any union workers that want to come back but will not displace present workers. It plans to appeal to the U. S. Circuit Court in Cincinnati.

How Much Are Directors Paid?

A National Industrial Conference Board survey shows that directors' fees have risen slightly, but $100 per meeting is still the most common amount—45 per cent of the firms pay that. About 17 per cent of the firms pay $50; 11 per cent pay $200. The range: $10 to $1000.

McDonald Says Steel Strikes Can Be Prevented

"We are going to find ways to prevent future steel industry shutdowns," David McDonald, United Steelworkers president, asserted last week after a meeting of the Kaiser Steel long range committee on labor-management problems. Added Edgar F. Kaiser, chairman: "We are really getting down to specifics, and I think we are going to find an answer."

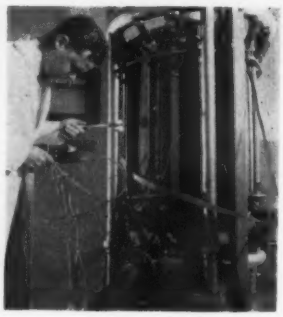
Plasticmakers Plan Technical Trade Group

Strong segments in the plastics industry plan a trade group to do long range basic research, assimilate technical information, and encourage the training

of more technical people. The "Plastic Institute" would be composed of producers, fabricators, suppliers, customers, and equipment makers. Committee Chief Louis F. Rahm says the industry has spent too little time on "the sober consideration of joint research, educational, and informational needs of the industry."

Westinghouse Builds Biggest Thermoelectric Generator

Westinghouse Electric Corp. has developed the most powerful (5 kilowatts) thermoelectric generator built to date. For the Navy's Bureau of Ships, the experimental unit will be used to evaluate power generation methods and fabricating techniques. Two subgenerators (one in photo) are connected to give the full power output. They are built up from thermoelectric modules which can be arranged to give output and currents from 10 volts at 500 amperes to 120 volts at about 42 amperes.



Straws in the Wind

Retail auto sales in the first third of May hit 168,000 units—up 5 per cent from the first third of April . . . Canadian National Railways is expected to order one hundred, 36 ft, closed aluminum vans this year for piggyback service . . . A Western railroad is planning to use 8 in. thick, reinforced plastic doors for a new fleet of 250 freight cars . . . Electronic Industries Association will start testing stereophonic radio broadcasting equipment in two weeks. . . . The Federal Reserve Board's industrial production index for April remained at the March level of 165 (1947-49 = 100).

Waterborne Commerce Tops Billion Tons for Fifth Year

U. S. waterborne commerce in 1959 totaled 1.048 billion tons—4 per cent above the 1958 mark of 1.005 billion tons, the Army Corps of Engineers reports. Breakdown: Inland—387 million tons; foreign (imports plus exports) —327 million; coastal—204 million; Great Lakes—130 million.

Metalworking Pulse

The Business Trend: Stability is the predominant feature of STEEL's industrial production index. In the last five weeks, the trend line has fluctuated within a 3 point range. **Autos:** On the strength of a continuing buying wave, second quarter production schedules have been boosted another 3 per cent. **Steel:** Output has declined four consecutive weeks, and further cuts are expected.

- **INDUSTRIAL PRODUCTION**
  - Week ended May 14 .... **162†**
  - Year ago **170**

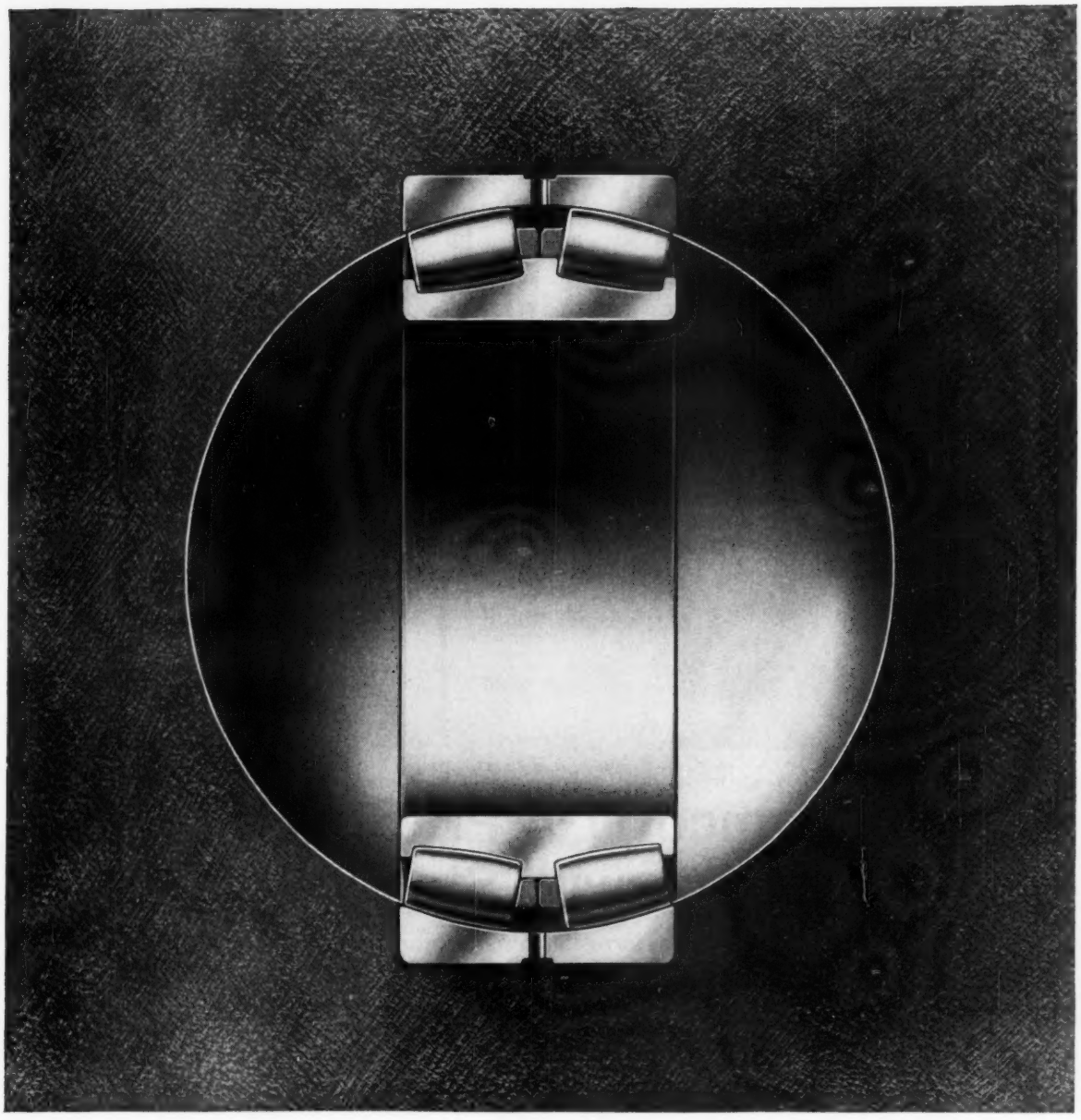
  Details on Page 105
- **PASSENGER CAR PRODUCTION**
  - Week ended May 21 .. **150,000***
  - Year ago **133,568**

  Details on Page 101
- **INGOT PRODUCTION RATE**
  - Week ended May 22 .. **71.7%†**
  - Week ago **73.8%**

  Details on Page 171

†Preliminary. *Estimated.

Copyright 1960 by STEEL, Penton Building, Cleveland 13, Ohio



IN TORRINGTON SPHERICALS . . . NO COMPROMISE WITH QUALITY

The spherical design concept is the major factor in the superior performance characteristics and longer service life of Torrington Spherical Roller Bearings. It provides inherent self-alignment . . . allows compensation *within* the bearing for initial or dynamic misalignment. It insures the maintenance of full radial and thrust capacity under these conditions.

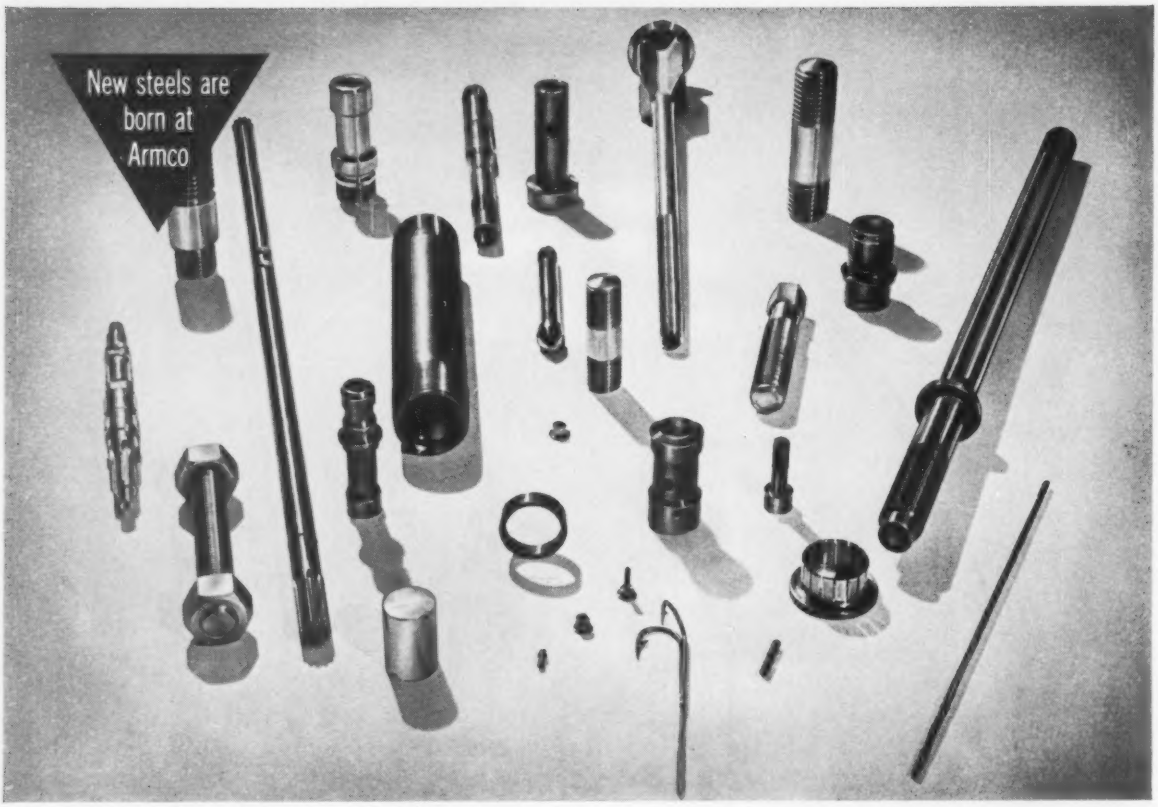
The center guide flange thrust surface and mating roller ends are spherically ground to the same radius. Under load, the roller seeks positive contact with the center flange. The result is extremely accurate roller guidance, a high degree of geometric stability, minimum friction, and truer rolling motion.

Torrington Spherical Roller Bearings are one outstanding example of Torrington's uncompromising research, engineering and manufacturing skills. They are your assurance of the ultimate in bearing performance.

THE TORRINGTON COMPANY

South Bend 21, Indiana • Torrington, Connecticut

PROGRESS THROUGH PRECISION—IN BEARING DESIGN AND PERFORMANCE



Why Armco 17-4 PH Stainless Steel Packs Parts with Stamina

Stronger than Type 416; Corrosion resistance in the class of 18-8

Fabricate parts from 17-4 PH stainless steel bars. Then get high strengths (Ultimate tensile: 200,000 psi; Yield: 185,000 psi) by short-time 900 F heat treatment. No scaling. No distortion.

Economical parts made of Armco 17-4 PH are not only harder and stronger, but much more resistant to corrosion than those of Types 410 or 416. They are comparable in many applications to 18-8 stainless grades in corrosion resistance and superior in some.

Armco 17-4 PH stainless steel bars and wire, for shafts, valves, fasteners, and similar strong, corrosion-resisting parts, are readily available through Armco Sales Offices and steel service centers of Armco Stainless Distributors. Call one of them today, or mail the coupon for more data.

Identify durable stainless products with the STEELMARK.

ARMCO STEEL CORPORATION
2000 Curtis Street, Middletown, Ohio

Send more data on Armco 17-4 PH Stainless.

NAME .....

TITLE .....

STREET .....

CITY ..... ZONE .....

STATE .....

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Will Your Product Sell?

A few days ago the president of a company building special machinery took us through his plant.

We stopped in front of a new machine for the selective hardening of steel shafts.

"This machine," he said, "cost us a lot of money, but it hardens shafts to the precise depth required. We get no distortion, and there is less scale to grind off."

We looked questioningly at a heat treating furnace nearby.

"We no longer use the old furnace," he said, "and we will junk it as soon as we need the floor space."

Then we were shown new, tape controlled, high production machine tools and older, standard machines.

"We could not afford not to buy the new tools. As for the others, they are about ten years old, but nothing better is available. As soon as someone comes out with a better machine, they will be replaced."

Then we asked him about his own products.

"Back in 1958 business was pretty slow, and we decided to redesign everything we were making. That move paid off in increased sales in 1959 and is making 1960 our best year.

"As for the future, I'll give you a peek at a product we think will really set our competitors back on their haunches."

That true story concerns industrial equipment. But it can be applied time and again to everything from materials and components to finished products.

We are in a period of rapid change in which as much imagination must be applied to redesigning old products as to developing new ones.

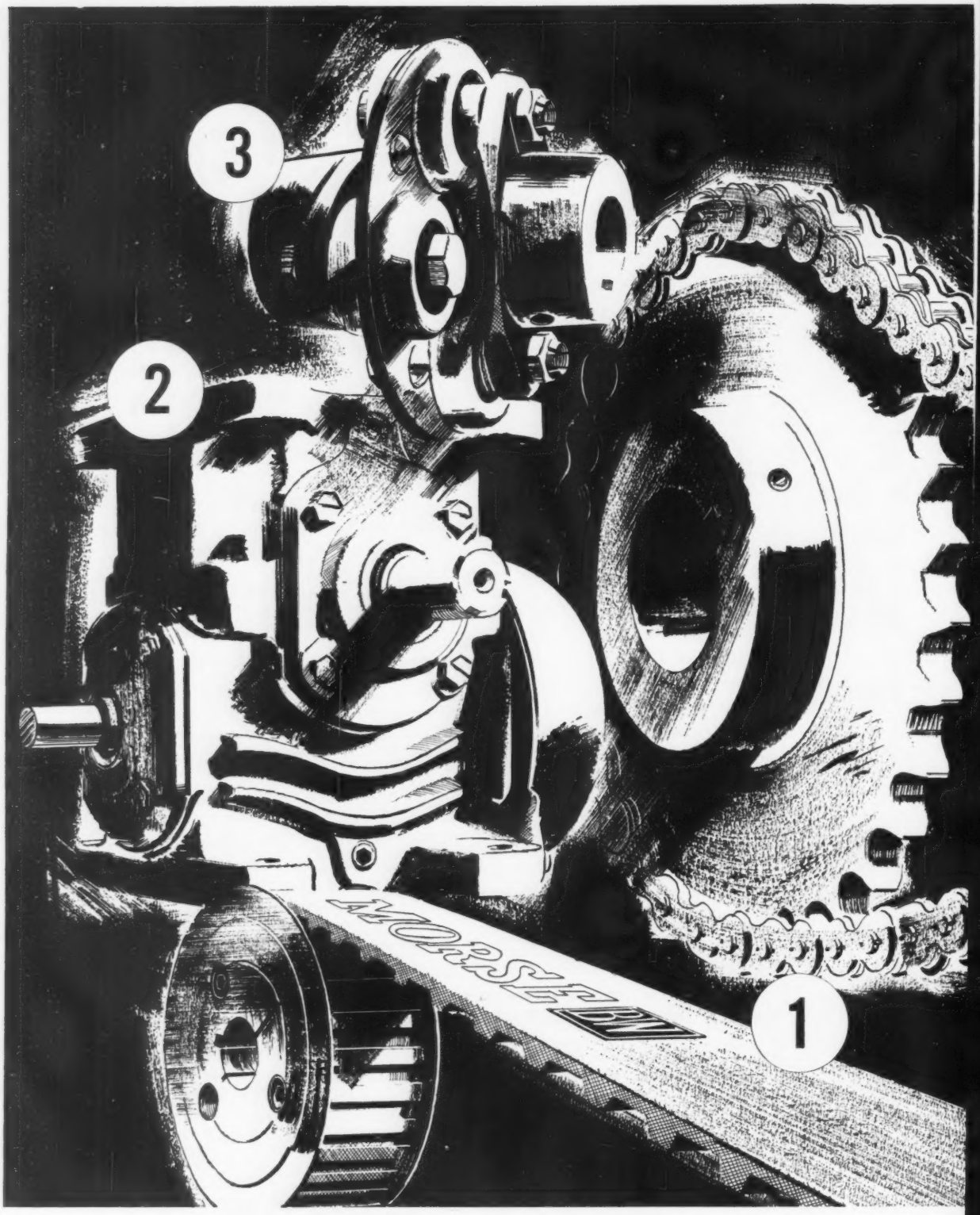
The market for any product no longer can be taken for granted.

Even if your product is doing well today, we think you should get the answer to this question:

"Will it really sell in the future?"

Irwin H. Such

EDITOR-IN-CHIEF



ONLY MORSE OFFERS ALL 4

1 BASIC DRIVES

Morse offers a complete line of Roller Chain, Silent Chain, exclusive Hy-Vo® Drives, "Timing"® Belts and Sprockets.

2 SPEED REDUCERS

Eberhardt-Denver "RW" PoweRgear® Reducers, Gearmotors, Worm Gear Reducers, Conveyor Drives, Mitre Boxes, Helical Reducers.

3 COUPLINGS

Flexible Roller and Silent Chain Couplings; Morflex Couplings, single and double; Morflex Radial and Marine Couplings.

4 CLUTCHES

Morse Cam (Over-Running, Back Stopping, Indexing), Pullmore, Over-Center, Torque Limiter and Centrifugal Styles afford flexible control of power.

Only Morse offers all 4 . . . only Morse can accept

Full responsibility for your industrial power drive

Drives, speed reducers, couplings and clutches . . .
designed better, built better, distributed better and backed by the only company that takes on the whole job of satisfying you

If you have a production process that requires transmission of mechanical power, it just makes good sense to deal with a company that can take on the *whole* job—furnish *all* the components—guarantee your satisfaction with the *complete* power train.

And *only* Morse can do it!

Drives, speed reducers, couplings and clutches: Morse designs them better to work together . . . builds them better to high quality standards for longer life, in a wide variety of sizes and capacities ideally suited to any job. Moreover, Morse distributes them better for broader, faster customer availability.

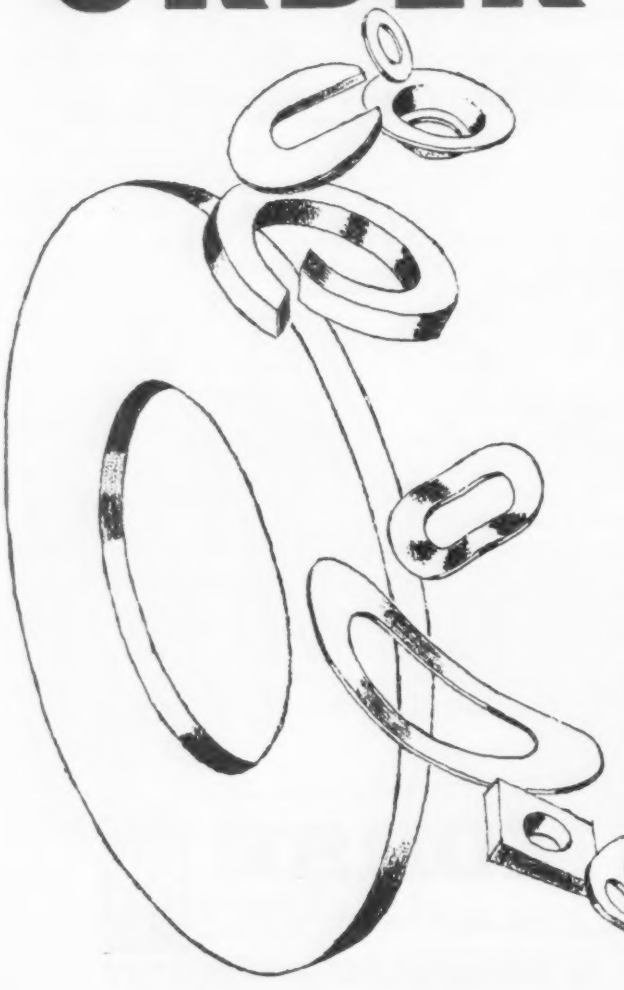
Morse—the No. 1 supplier of automotive timing chains—has, through continuous expansion, evolved a complete line of exclusive power-transmission products. Among them, the well-known Morflex couplings . . . H-E roller chain . . . Hy-Vo® drives . . . Rockford Clutches, Eberhardt-Denver speed reducers and full line of components for the broad industrial fields.

Whether your next project calls for a single coupling or a complete power train, your Morse distributor is the man who can help you most. He's always nearby, listed in the Yellow Pages. Or, if you wish, write direct: Morse Chain Company, Dept. 2-50, Ithaca, New York. Export Sales: Borg-Warner International, Chicago 3, Illinois. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario.

MORSE B-W

A BORG-WARNER INDUSTRY

ALL ON ONE ORDER



You simplify procurement and assure satisfaction when you standardize on

MILWAUKEE WROT WASHERS

To get everything you need in washers — *on one order* — it pays to specify "Milwaukee Wrot" on every washer requisition you write.

One word tells the reason why: Specialization.

Milwaukee is the one prime source that has devoted more than 70 years to the volume production of quality washers. Special machinery — special production techniques — special facilities — special quality controls combine to make Milwaukee Wrot Washers the unmatched standard of superiority, the world over.

Whether your need is for "standards" or "specials," the complete Milwaukee line offers unrestricted selection. Factory stocks covering thousands of types and sizes, *plus* over 100,000 production-ready dies, make it unnecessary for you to tie up capital in long-range inventories.

TYPES AVAILABLE

- Manufacturers' Standard Size Washers
- SAE Standard Flat Washers
- Bellville Type Washers
- Sems Washers
- Narrow & Wide Rim Machinery Bushings
- Light Steel & Riveting Washers
- ASA Lock Washers
- Spring Tension & Wave Bend Washers
- Army-Navy Standard Washers
- Machine Screw Washers
- Axle & Carriage Washers
- Structural Washers
- Countersunk Finishing Washers
- Flat & Bevel Square Washers
- Drawn Center Washers
- Bedspring & Mattress Washers
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- Expansion Plugs
- Cupped Washers
- Dished Washers
- D-Hole Washers
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- Discs, Blanks & Special Designs to Virtually Any Specification

All Available in a broad range of ferrous, non-ferrous, stainless steel, plastic and fibrous materials

Standardizing on Milwaukee Wrought Washers Means Standardizing on Quality

WROUGHT WASHER MFG. CO.
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The World's Largest Producer of Washers

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SAN FRANCISCO—H. P. Etter, president, Air Reduction Pacific (center), and E. W. MacCorkle Jr. (left), tell Associate Editor Ross Whitehead: "First quarter sales this year ran 10 per cent ahead of 1959's. We've got our fingers crossed for the rest of the year. It looks good"

Westerners Keep Fingers Crossed

STEADILY INCREASING sales are helping Western metalworkers push ahead from a good although somewhat disappointing first quarter.

That's the consensus of businessmen up and down the coast, STEEL's air safari editors learned.

Prices are expected to stay firm for awhile but may increase in a few areas—particularly after steel wage hikes take effect in December. Layoffs in the aircraft industry have probably hit bottom. The transition to missiles and diversification programs is moving swiftly.

A built-in factor in the West's favor: A population explosion. "In Southern California alone, the population grows by 150,000 yearly," states Morris Pendleton, president, Proto Tool Co., Los Angeles.

Here are comments the editors heard:

SALT LAKE CITY, UTAH—Second quarter business will be 30 per cent ahead of the first quarter's, says Joseph Rosenblatt, president, Eimco Corp.

• **Metals**—Sales are 17 per cent above those in last year's first quarter, says T. J. Ready Jr., executive vice president, Kaiser Aluminum & Chemical Corp., San Francisco.

The general metals picture is healthy, reveals Jean LaForce, manager, Linde Air Products Div., Union Carbide Corp., San Francisco.

"In spite of a slow start, we expect an 8.7 per cent increase over 1959 business," declares R. W. deWeese, vice president, sales, Electric Steel Foundry Co., Portland, Oreg.

• **Prices**—"We expect prices to remain firm, at least until December. Inflation is a dead issue," states Mr. Pendleton.

There is some upward movement in prices—firms have no way to escape fixed costs; interest rates are a really important factor, comments Herman A. Folgner, West Coast manager, Handy & Harman, El Monte, Calif.

• **Employment**—"We see a slight decrease in our em-

C. F. Borden, executive vice president, Kaiser Steel Corp.

T. J. Ready Jr., executive vice president, Kaiser Aluminum & Chemical Corp.

T. A. Bedford, vice president, Kaiser Engineers Div., Henry J. Kaiser Co.

The Kaiser View . . .

MR. BORDEN expects steel prices to remain firm, except for reinforcing steels which are affected by imports. He sees no changes in Kaiser Steel's employment at least until after the third quarter.

MR. READY says that his firm's first quarter sales were disappointing due to inventory reduction by buyers. "But our original estimate for a 5 to 10 per cent increase in sales throughout 1960 is turning out to be accurate."

MR. BEDFORD reports nonferrous construction is at a low ebb. Ferrous construction is generally better because of the steel industry's heavy emphasis on cost reduction. "Construction costs are going up, our profit margins down."

ployment," declares Leo Carter, president and general manager, Santa Monica Div., Douglas Aircraft Co., Santa Monica, Calif.

Boeing Airplane Co.'s employment will probably be relatively stable, thinks Hal W. Haynes, comptroller of the Seattle firm. Employment in electronics firms is increasing steadily, reports Litton Industries Inc., Beverly Hills, Calif.

Employment outside the aircraft industry is showing a slight increase in Seattle, states Tora McCredy, director of research, Seattle Area Industrial Council.

• Aircraft people are reacting vigorously to cutbacks with diversification and changeovers to missiles.

John H. Richardson, director of marketing, Hughes Aircraft Co., Los Angeles, states that first quarter business was 4 to 5 per cent below that of the similar period last year. There is some indication that it will be 12 to 18 months before it turns upward. The company doesn't think that manned aircraft are on the way out; but it is developing new electronic markets. Example: Tape control for machine tools.

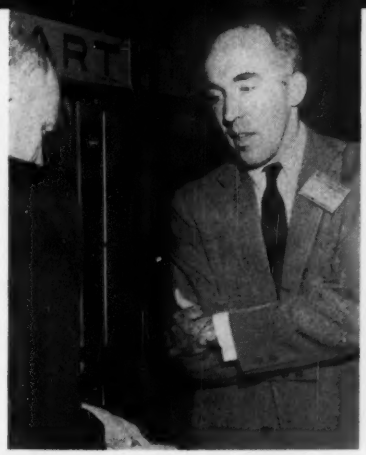
Much help is expected from research and development dollars being poured into missilework. Douglas, for example, just concluded a $65 million contract for the second stage of the Saturn project. Other strong projects underway include cargo aircraft, space programs, and manned Navy aircraft.

Mr. Haynes of Boeing is optimistic about research and design dollars. The company is working on Dynasoar, Minuteman missile, KC-135 tankers, 707 jets. It is also continuing to make the B-52 H.

The slack from aircraft layoffs is being taken up by California's and the Northwest's highly diversified economy. Mrs. McCredy points out that employment in other than aircraft is up, and that unemployment figures showed only slight increases. A Los Angeles Sunday paper carried more than 90 columns of advertising for skilled and engineering personnel—a trend attributed to the many new firms entering the electronics and missiles fields.

Atomic energy business is stable; slow employment increases are expected throughout 1960, says J. R. Wolcott, manufacturing manager, Atomic Energy Dept., General Electric Co., San Jose, Calif.

LOS ANGELES—Slow business during the second quarter will be followed by a strong third and fourth, believes Robert Stewart, vice president, Western Precipitation Corp.



WELDING SHOW, LOS ANGELES—Equipment sales are steady; first quarter was slightly higher than the previous quarter," says Wm. H. Hobart Jr., Hobart Bros. Co., Troy, Ohio

LOS ANGELES—"Douglas Aircraft sales are above last year's at this time. Profits on jet production will come later this year," says Leo Carter, president, Santa Monica Div.

WELDING SHOW, LOS ANGELES—Welding products will be up substantially in the third quarter, say Union Carbide executives Jean LaForce (right), C. S. Richmond (center), and R. C. Barrett

SEATTLE—"Over-all business is firming up," declares Hal W. Haynes, comptroller, Boeing Airplane Co. He sees little employment change, no cost decline. (Union contract is being negotiated)

• STEEL visited the American Welding Society's annual show to get the general metals picture. Again, we found a bullish atmosphere.

Herman A. Folgner, Handy & Harman, says his firm's first quarter sales were slightly ahead of those in the first quarter last year. He also notes that the Northern California employment picture has also improved considerably.

C. H. Teller and A. R. Wynn, western representatives, Welding Products Div., Harnischfeger Corp., Seattle and Los Angeles, point out that sales for '60 are 20 per cent ahead of those in the comparable 1959 period. "Delivery of electrodes, particularly in Los Angeles, has not yet caught up with the market." Oil tools is a weak area.

Charles Ducommun, president, Ducommun Metals & Supply Co., Los Angeles, states his second quarter sales are up slightly over last year's. "This area has lived with slumps before. We are optimistic. We are working on five year growth programs. So far as I know, all the plants we do business with are all working in the black."

• Northwest construction is strong.

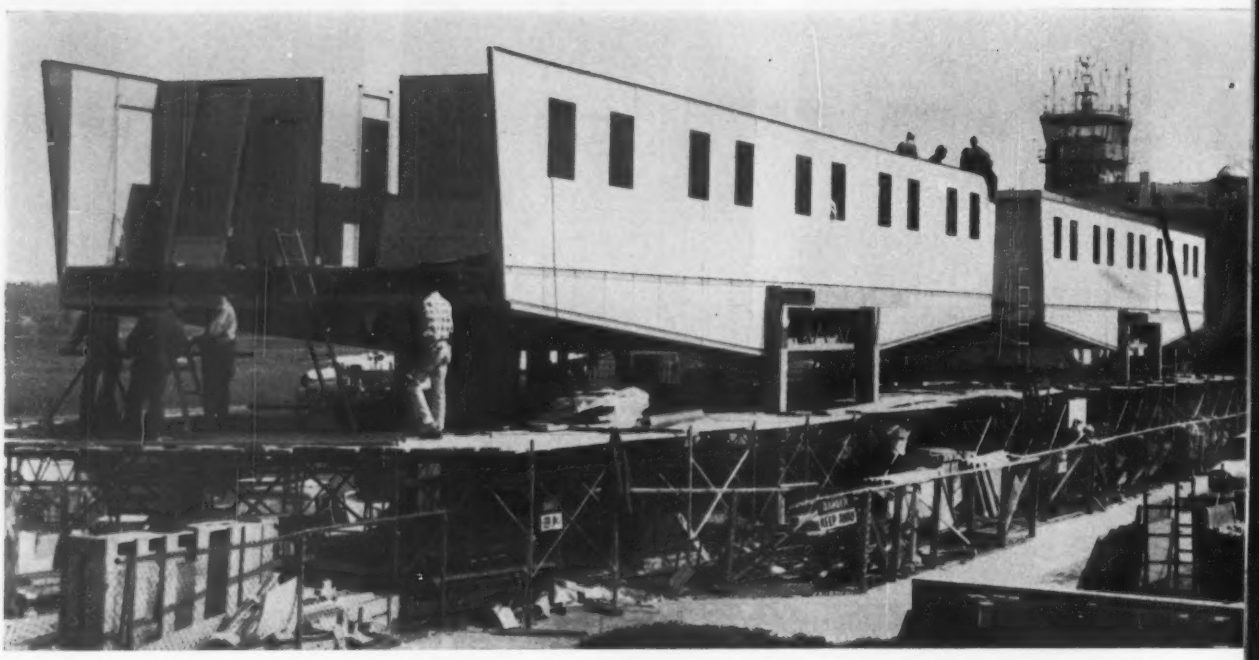
R. C. Hill, STEEL's Seattle correspondent, reports that employment prospects for the third and fourth quarters are good.

Bethlehem Steel Co., Seattle, reports steel production down but that production detailers who prepare the paperwork for reinforcing bars in construction are working seven days a week on plans for summer and fall construction.

Puget Sound Bridge & Dredging Co., Todd Shipyards, and Pacific Car & Foundry, Seattle, all report a generally quickened business tempo.

Portland sources report that many Eastern firms have located Western branches in their city.

STEEL's air safari editors check the business pulse of the Gulf States next week.



Workmen are installing porcelain enamel steel panels on one of two curtain wall Airwayte units at Washington's National Airport. Each unit has 18 compartments (7½ by 6 ft) with Pullman-like accommodations. Construction is by the American Bridge Div. of U. S. Steel Corp.

Sky's the Limit for Metal Buildings

"METAL BUILDINGS can become one of the major steel consumers by 1970," predicts Logan T. Johnston, president of Armco Steel Corp.

The corporation's Armco Drainage & Metal Products Inc. is one of about 15 companies that build and sell metal buildings nationally. It's estimated that 200 to 400 firms are in the business.

• **Growth** — Metal buildings are made primarily of steel and/or aluminum. They took only a few thousand tons of steel in 1939, 500,000 tons in 1959. The figure will more than double in the next ten years, Mr. Johnston believes.

The industry's dollar volume has increased at the rate of 25 per cent annually for the last three years. D. H. Malcom, Armco's manager of building sales, expects it to climb 20 per cent annually for the next decade, so that by 1970 sales of steel and aluminum structures will be six times greater than they are now. Currently, the market is only 3 to 5 per cent saturated.

• **Pyramid**—Factory volume of fabricated components will approximate $200 million this year compared with $75 million only five years ago. Construction volume must be projected to include shipping charges, other materials, and erecting costs. Those items account for an additional $400 million (see table). Heating, plumbing, wiring, and finishing costs add another $400 million. The grand total: A $1 billion industry.

The old dream of mass production in construction is being realized in the metal building industry. Prefabricated parts are standardized, but the end products aren't. Armco, for example, has 10,000 parts in stock for 1600 different types of buildings.

• **Scope of Market**—But the dream is still fleeting in the housing phase of metal building. That segment accounts for less than 10 per cent of all sales (see the table). Major manufacturers, such as Butler Mfg. Co., Kansas City, Mo., steer clear of housing. The prime roadblocks are restrictive building codes, problems with construction trade unions, and the lingering-though-outdated image of metal buildings as "tin shacks."

Aluminum producers are having the most success with housing. But of the 350,000 tons of aluminum produced for building products this year, most will go into nonhousing elements. Inland Steel Products Co., Milwaukee, points out that aluminum is used primarily as a siding material, specified for one of ten metal buildings erected.

• **Aesthetic Accent**—The emphasis in new models is on appearance. For example, Stran-Steel Corp., a division of National Steel Corp. retained styling expert Harley Earl

All-Metal Prefabricated Building Construction

(Millions of dollars)

1960	$600
1959	595
1958	382
1955	308
1954	278
1947	75

Estimated STEEL; interior finish, plumbing, heating, and electrical costs not included.

Who Buys All-Metal Buildings

(Per Cent)

Farm-agriculture	15
Commercial	25
Industrial-storage	50
Others, including housing	10

as a consultant. He's a retired General Motors Corp. vice president.

Metal buildings can be finished in a variety of materials, including aluminum, aluminized, porcelained, painted or plastic coated steel, and even masonry or wood. "The materials complement one another and add to each other's value," points out W. O. Robertson, president of Armco Drainage in introducing its new models.

• **Lower Costs**—Mitchell Engineering Co., Columbus, Miss., estimates that in some cases metal building costs can be 50 to 60 per cent lower than those of conventional structures. American Metalcore Systems Inc., Baltimore, cites erection speed as one reason. Its design for a filling station can be put up in one week. Macomber Inc., Canton, Ohio, uses only four men to erect a V-lock prefab steel frame in 1 hour.

On the average, steel buildings cost 25 per cent less than comparable structures of conventional materials. That's chiefly why they are the most promising market opening up for the metal in years.

Machine Builder Tackles Two-Way Trade Problem

INTERNATIONAL trade is a two-way street, says Harry Reichert, vice president-export, Pratt & Whitney Co. Inc., West Hartford, Conn. Discussing his company's approach to the export-import business, he adds: "If we, in this country, wish to continue to enjoy our position as exporters, we also should be importers of outstanding products manufactured abroad.

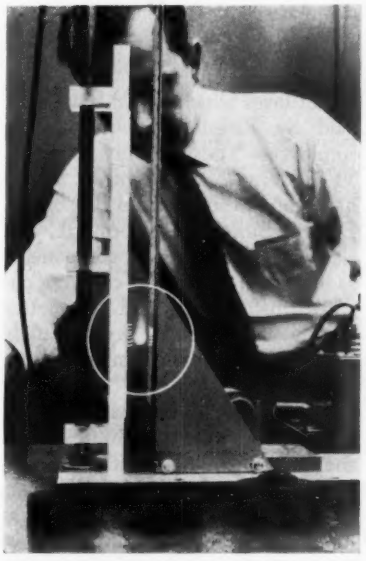
"Manufacturers abroad must have the opportunity to earn dollars by exporting their products to the U. S., to be in a position to purchase our products."

• **P&W Approach**—The company is importing and distributing many foreign made products. At the company's 100th anniversary celebration, Mr. Reichert cited an agreement with the French firm, Les Innovation Mechaniques, to distribute the SIM lathe in the U. S.

On the other side: P&W has licensed a firm abroad to make the Potter & Johnson automatic turret lathe and recently granted permission to an English builder to make the Keller BG-21, automatic tracer-controlled milling machine.

• **Product Approach**—Mr. Reichert says: "Today, only special gages and special machine tools, units of high productivity or great accuracy, can be exported. Standard equipment of fine quality is being made in large quantity by many European countries and exported throughout the world at prices much lower than manufacturing costs in this country."

Using this philosophy, he says P&W has a prosperous export business that is handled by importers in more than 40 countries.



ELECTRONIC MEASURING DEVICE designed by Chevrolet engineers calculates the energy absorbing characteristics of rubber and Butyl samples. A steel ball is dropped on a sample and the height of its rebound is recorded by the spark that jumps from the ball to sensitized paper

Brass Industry Steps Up Product Development

Domestic brass mills are plagued with a two pronged problem: Lower per capita consumption and spiraling imports—they hit 1.9 million lb, or 10 per cent of domestic production, last year.

After a 25 per cent gain in shipments (total, 1.905 billion lb) in 1959, the industry expected the figure to reach 1.943 billion lb in 1960. Now, after a depressing first quarter, estimates have been revised to 1.862 billion lb.

The industry is emphasizing product development and marketing. Dr. Clyde Williams, acting head of the new Copper Products Development Association, listed some of his group's projects at a meeting of the Copper & Brass Research Association in Hot Springs, Va., last week: Stainless copper; new protective finishes; increased use in cast iron and as an alloying element in steel; new copper base alloys; new uses in electric power, construction, and transportation; copper chemicals for industry and agriculture.

Mitsubishi's Bid Was $913,000 Lower, but . . .

$500,000 was lost in income taxes unsuccessful U.S. bidder would have paid

$438,000 was lost in income taxes employee's of U.S. firm would have paid (basis: 15% tax on manhour lost, $2.50 per hr)

1,117,000 represents manhours of work lost by U.S. firm's employees

$115,000 extra must be spent by U.S. to investigate facilities of foreign company

Plus –taxes and manhours lost to U.S. suppliers and their employees

Small Ohio Firm Fights Back

JUST EAST of the celery mucklands of north central Ohio lies the village of Plymouth (Population: 1600). The Fate-Root-Heath Co. is the town's only industry. Sixty per cent of F-R-H business comes from the manufacture of industrial locomotives.

Last year, a team of Japanese locomotive builders, sponsored by the State Department, visited Plymouth. This month, Fate-Root-Heath lost its bid on 39 locomotives and three cranes for the Panama Canal Co., a government corporation, to a Tokyo firm, Mitsubishi Shoji Kaisha Ltd.

• **Impact**—Plymouth's workers feel the blow. The contract would have meant two and one-half to three years work for F-R-H, or 1,117,200 manhours of work. Although the government saved $913,000 on paper, it lost money in the long run (see exhibit above). The loss includes taxes which would have been paid by Fate-Root-Heath and its employees. The company estimates 30 per cent of the contract would have gone to suppliers in Pittsburgh, Detroit, Buffalo, Rockford, Ill., and Canton, Ohio, for such components as electrical products, gearing, engines, instruments, and locomotive wheels. The potential taxes of these companies and their employees are also lost.

Was the awarding of the contract to a foreign firm worth it? That's the question in the minds of Plymouth residents and metalworkers who may face the same problem as foreign competition mounts.

• **Not the First Time**—The specter of foreign competition is no stranger to Fate-Root-Heath. The company has seen it chop exports from 25 to 30 per cent of production to less than 10 per cent last year. Since the peak postwar year of 1957, sales have been sliding and thus far in 1960 are 4 to 5 per cent below the same period of 1959.

There have been other factors in its sales decline too. Domestic capital equipment buyers have taken a "wait and see" attitude this year. Although there have been lots of inquiries and many quotations, the orders just aren't coming in and the backlog is down. Then, too, dissimilar types of vehicles which may perform the same function as Plymouth locomotives have taken a slice out of the market potential. The high mortality rate in the industry will attest to that.

From a peak of 400 employees during World War II, F-R-H's labor force has been maintained at about 280 in recent years. Today, it's about 250. The locomotive works and foundry have been on a four day week since March, and a locomotive is being built for stock to keep men busy. Although no fur-

"IT'S PRETTY TOUGH to find a Republican around these parts any more," observes a leading Plymouth, Ohio, resident. One of the reasons is freshman Congressman Robert W. Levering, a Democrat from the state's 17th District, who is championing the village's fight in Washington.

Fighting the Japanese is not new to Representative Levering. A farm boy turned lawyer, he was a civilian with the War Department in the Phillipines at the time of Pearl Harbor. He made the notorious "Death March" from Bataan and spent over three years in Japanese prison camps. For more than a year, he shoveled slag on boxcars in a Mitsubishi plant, receiving a ration of two rice balls a day for a 70 hour week.

The Plymouth case may result in "the biggest mail we have ever received," says the representative's wife, who works at his side in Washington. He also received much encouragement last year in his attempt to find out why the Defense Department thought it wise to buy 37,000 military vehicles from Japanese manufacturers.

ther cutbacks are seen in the immediate future, the outlook for the rest of 1960 is "discouraging." But the company is optimistic for the long haul, citing it has weathered times worse than these. (The first locomotive produced at Plymouth rolled off the line in 1912.)

The locomotive business is not the only area in which F-R-H is feeling the sting of foreign competition. Its ceramic, or claymaking equipment, which accounts for 26 per cent of the company's business, has been hurt by the exit of the U. S. pottery industry to Japan. However, over-all volume in this division has been maintained because the construction boom has created a good demand for brick.

A special products division, which makes a raft of items, chiefly in the grinding and lawnmower sharpening field, rounds out the Fate-Root-Heath line.

• **What's the Answer?** — "We've been extremely active in new product development," emphasizes W. E. Root, general manager. A radio controlled locomotive was just introduced and an order has been placed by a leading steel company. Exhaust conditioners (scrubbers) have been developed for F-R-H diesel equipment and are approved by the Bureau of Mines for both nonexplosive and explosive minework. The firm hopes to crack the coal mine market with such units. It says diesels are more economical to operate than the electric locomotives now used in most coal mines. Shaft drives have been added to the line. Locomotives with stainless steel bodies were specially designed for U. S. Steel Corp. coke oven operations.

Sales of the special products division have remained stable, thanks to such new products as an industrial cleaning stand and a saw chain grinder, to name a few. All the company's products are continually being improved.

"We have good equipment and have trimmed costs wherever possible," says T. F. Root, advertising manager. "We have strengthened our sales force by adding new sales representatives, weeding out old ones, and doing more factory sales work. And we have maintained our advertising budget," he adds.

• **Buy American?**—But how to compete with low foreign wages is a real stumbling block. Points out D. B. Shaver, assistant sales manager: "If the percentages of the Buy American Act were adjusted or properly revised, the Act would serve its original purpose—to assist American producers to meet foreign competition. As it is, foreign firms, with their low wage rates, don't need to worry about making a profit. It's not how much does it cost, but how much can we sell it for in the U. S. They merely stay under the 6, 10, or 12 per cent differential, get the job, and make a tremendous profit, maybe even more than they would at home for the same work. A 25 per cent differential in favor of American firms is asking a minimum."

The citizens of Plymouth are disillusioned and confused. "You may think we sound like backwoods isolationists," muses one, "but you don't realize the impact of such a thing until it hits your back porch."

For what happened in Washington, see page 92.

Why Mitsubishi Won the Contract

AWARD of the Panama Canal locomotive contract to Mitsubishi (see Page 90) is having some unforeseen results in Washington. For one thing, it is now clear that the Army, which controls the canal, preferred the bid of Plymouth Locomotive Works, Fate-Root-Heath Co., Plymouth, Ohio. A private consulting engineer hired by the Panama Canal Co. (see exhibit) was positive that if the contract went to Mitsubishi the canal was certain to have problems in maintenance.

The engineer also foresaw difficulties in overseeing design and construction. Language barriers and experiences of the International Cooperation Administration with Mitsubishi were cited.

• **Army Moves**—It appears that the Army went to the Office of Civil & Defense Mobilization with the hope that the agency would rule in favor of the Plymouth, Ohio, firm. Under White House and State Department pressure, however, its case (STEEL, May 2, p. 40) was made to appear weak.

It is important to remember that the administration is conducting a tremendous behind the scenes effort to get foreign countries to reduce their trade barriers against U. S. exports. It is understood that OCDM told the Army that the award to Mitsubishi would not hurt national security and that an award to the Plymouth firm would hurt security in the sense that it would endanger our good relations with Japan.

• **Congress' Attitude**—On Capitol Hill, Rep. Robert Levering (D., Ohio) sums up the attitude of many congressmen, whether they are willing to go on record or not: "The State Department upset the apple cart; the taxpayer has taken a beating."

More congressmen are coming to agree with Representative Levering. The foreign aid issue promises to be a tough one for the administration to hurdle when it comes to getting the money to pay for the $4 billion program already authorized.

• **Executive Department**—An outspoken official of the Eisenhower administration told STEEL: There's a growing concern among government officials that the administration is going too far in its efforts to seduce world opinion in favor of the U. S.

Representative Levering adds: "There are some things that must be done at home first." The national security issue remains important, he says, because the canal is one of the most strategic areas in the Western Hemisphere. To rely on foreign technology in that area is to weaken our over-all defense posture.

• **Small Business Position**—One question which remains unresolved by the Army decision: The place of small firms in the administration of the Buy American Act. OCDM saw no way it could allow an additional 6 per cent to the Ohio firm.

How the Mitsubishi Bid Stacked Up

1. TRACTION MOTORS
Mitsubishi's motor is not clearly in accordance with Panama Canal Co.'s specifications.

2. INTERMEDIATE GEAR TRAIN
Support for intermediate gear appears inadequate. Means of lubricating gear not apparent.

3. MULTISPEED GEARBOX
Clutch appears unnecessarily complicated.

4. GEAR COUPLING (between multispeed and final gearboxes)
May be source of trouble.

5. FINAL DRIVE GEARBOX
High maintenance can be expected.

6. CLAW CLUTCH
Design should be investigated for positive engaging.

7. WINDLASS DRIVE
It's hydraulic, cannot be repaired by ordinary shop facilities. Locating motor inside windlass drum precludes substitution of equipment of another make.

8. ANTIBACKLASH DEVICE
It should be driven mechanically from the drum at slightly higher peripheral speed than the drum in the paying out direction.

9. WINDLASS MOTOR
Temperature rise of the motor does not meet specifications.

10. CRANE
Control of the main and auxiliary hoist is not as flexible as might be desired.

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A BIGGER PRESSFUL OF PERFORMANCE

- Rigidly built, all-steel frames of patented, triple box section design.
- Box-type, welded steel slides reinforced with heavy webbing.
- Extra-long, adjustable gibs that fully contain the slide during working stroke.
- Laminated, non-metallic ways . . . an exclusive Niagara press feature to prevent scoring.
- Low-inertia pneumatic friction clutch and brake for trouble-free, high production.
- Centralized pressure lubrication.
- Operating controls conveniently arranged on master panel.
- Unusually liberal shutheight and extremely long slide adjustment to accommodate a wide range of stamping and forming dies.

TWO-IN-ONE FLEXIBILITY

Here's a 250-ton Niagara Straight Side Double Crank Press, at contract metal stamping plant of Belmet Products, Inc., equipped with:

1 Roll feeds for progressive die work on coil stock.

2 Nine-station transfer feed mechanism and dies for work with pre-cut blanks . . . quickly removable as a self-contained unit.

Progressive die stamping . . . deep drawing . . . heavy blanking . . . lamination punching . . . you name it! Niagara Straight Side Single and Double Crank Presses are the profitable choice for numerous stamping requirements. No other line can match them in the middle capacity range. Once you've checked their operating and structural features, it's easy to see why.

Built in a combined range of 50 through 500-ton capacities, Niagara Series SC-1 and SC-2 Presses are available in non-geared, single geared or double geared models, with either single or twin-end drives. All can be outfitted with automatic feeds, adjustable speed drives, pneumatic die cushions, special controls and devices for automation.

Learn how you can get "a bigger pressful of performance." Be prepared for the next time you buy a straight side — single crank or double crank. Write for illustrated Bulletin 64. *Niagara Machine & Tool Works, Buffalo 11, N. Y., District Offices and Distributors Everywhere.*

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America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work.

500 TONS OF LEAD

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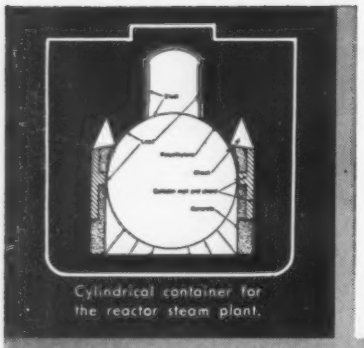


Cylindrical container for the reactor steam plant.

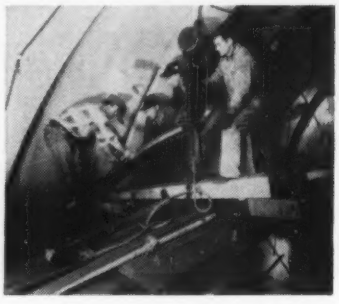
The 20,000 ton N. S. Savannah
Speed: 21 knots.
Cruising radius: 350,000 miles.

PB-130

The 20,000 ton N. S. Savannah contains some of the most advanced radiation shielding yet developed. Over 500 tons of lead, along with water, concrete and polyethylene, provides such a high degree of safety to the crew and passengers that a man standing on the main deck will receive no more radiation from the powerful reactor under his feet than he will from the sky.

The cylindrical container for the reactor steam plant is a steel pressure vessel averaging two inches thick. It measures 35 feet in diameter and is 51 feet long. The radiation shield is divided into two parts. The first, which surrounds the nuclear reactor is composed of a shell of water thirty-three inches thick and approximately three inches of lead. The second, which covers the entire containment vessel, is composed of concrete, polyethylene and a shell of lead four to eight inches thick.

Lead is a preferred material for radiation shielding because of its density. Shielding effect against the deadly gamma radiation is directly proportional to the density of the shield, and lead is the densest of all the commonly available materials. It, therefore, provides the best protection per unit of shield thickness at the lowest cost. Thus lead — one of the oldest metals known to man — is a major factor in the rapidly expanding utilization of man's newest discovery, Nuclear Energy.



500 tons of lead in the form of sheets 6x3 feet and 1 or 2 inches thick were preformed to the cylindrical shape with a rolling jig. Spherical end sections were die formed.

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THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

Steel Fires Its Marketing Guns

A. J. Paddock, president, American Bridge Div., U. S. Steel Corp., typifies the approach. He's holding a strip of stainless steel "foil" 0.001 in. thick. On the table (l. to r.): Samples of vinyl coated sheet steel in various colors and embossed textures; a container fabricated from vinyl coated steel; sections of cold formed "SteelFast" members designed to reduce the time and cost of installing dry wall panels in home construction; two prototype containers made from U. S. Steel's recently announced thinner, lighter tin plate; two pieces of fine-mesh screen woven from stainless steel wire 0.001 in. in diameter; a bar of carbon structural steel and a thinner, lighter one of "T-1" constructional alloy steel which can withstand the same load in tension as the heavier bar.

THE MARKETING GUNS of the steel industry are beginning to boom louder.

The targets:

1. To regain markets lost to aggressive domestic competitors—aluminum, plastics, nickel, structural glass, paper, and plywood.
2. To combat the price squeeze of foreign competition.
3. To develop new markets and applications in an effort to boost the nation's steel consumption more closely in line with the industry's tremendous production capacity.

First major salvo was fired last January when the American Iron & Steel Institute announced a campaign to promote the use of steel with the adoption of the Steelmark symbol. Last week U. S. Steel Corp., the nation's biggest producer, took two occasions to let metalworking know that it has stepped up the pace of its marketing march.

On Tuesday it officially opened its new Electromechanical Engineering Building at its research center in Monroeville, Pa. On Wednesday, Austin J. Paddock, president of U. S. Steel's American Bridge Div., challenged the auto industry to make better use of the steels already available and then described how the corporation's applied research program was geared to help metalworking engineers do a more effective job of using today's steels.

• **For Production Efficiency** — Emphasis in the new laboratories will be on the development and application of control systems for new and existing processes in all steelmaking functions. "We want to do this," said J. B. Austin, administrative vice president-research and technology, "first, to obtain even higher quality, and second, to improve the yield of our mills."

He cited the new punch card controlled structural mill in the corporation's South Works, Chicago, (see Metalworking Week, p. 76) as an example of the type of work carried on by electromechanical research. Such research will include problems ranging from material handling to development of automatic devices for controlling temperature of furnaces and thickness of product. A pilot blast furnace, most advanced of its type in the world, is scheduled for completion this fall.

• **Need for Imagination**—Addressing the Engineering Society of De-

troit, Mr. Paddock declared: "It's too bad that, in the popular mind and all too frequently in the mind of many engineers, steel is just plain, old garden variety.

Today, we have weldable high strength, heat treated constructional alloy steels with a tensile strength of 115,000 psi and yield strength of 100,000 psi available in gages down to one-eighth inch for automotive, missile and manufacturing applications. Unfortunately, we are not getting the use we should be getting out of them. For one thing, we are limited by the imagination and creativity of professional men who still think in terms of the standard carbon steels and whose designs never go beyond their possibilities."

To meet the challenge, Big Steel has: 1. Set up a special department for application research. 2. Brought together under one roof everything it knows about its products, its customers' products, and the major steel consuming industries. 3. Assigned task forces to the solution of problems that limit the use of steel in important markets.

• **Industry Approach**—U. S. Steel's application research department is not staffed to solve customer problems. It is seeking general solutions to industry problems and making its findings available to all potential users. Customers can adapt the improved products, methods, or designs to the solution of their problems.

The initial research efforts are being directed at six important markets: 1. Architectural. 2. Structural. 3. Automotive. 4. Railway. 5. Domestic. 6. Nuclear. Each has its own task force and works closely with other members of the marketing team—product development, market development, and product sales—to retain present markets, recapture those that have been lost, and develop new ones.

Headquarters for the activity is the corporation's sprawling research center at Monroeville, Pa., near Pittsburgh. At present, 18 to 20 members of the applied research staff are devoting their full time to the work. Within the next few years, the number will probably be doubled.

• **Broad Program**—To sell its product in an era of surplus capacity, U. S. Steel feels that it must get its message across to all the people who influence selection of a material—designers, engineers, accountants, and production men. One of the best methods: By helping an industry redesign its product so that it can cut costs, reduce weight, and make the most effective use of newer and stronger alloys.

Shift of Stance—The only thing that's really new about U. S. Steel's application research effort is its administration, the establishment of a special department under one roof and one man's direction. The corporation has been offering customers technical assistance and developing new products to meet their needs for years. Examples:

• In 1926, it produced wide flange beams in answer to fabricators' demands for a more efficient standard section that would permit them to erect higher buildings.

• In 1933, it developed Cor-Ten high strength steel to meet the rail-

How can we reduce the cost and weight of this building? That's an everyday assignment for U.S. Steel Corp.'s architectural application research group. Their answer: Redesign it, using newer and stronger steels. Studying plans (left to right) are G. O. Johnson, chief research engineer-architectural applications; Dr. R. B. Mears, director of applied research; and R. I. Hossli, staff member. They designed and built the mockup (right) to show off some new steel products for housing construction: Overlapping porcelain enameled roof sections (2 ft wide x 25 ft long) that eliminate the need for tar paper and nailing surfaces; ribbed wall panels (4 ft wide x 8 ft high) that are enameled on one surface, vinyl coated on the other, and insulated with a polystyrene or polyurethane core; a steel door that's insulated to prevent condensation on the interior surface; improved steel sash windows

roads' requirements for a construction material which would enable them to design lighter cars that carry more payload.

• In 1937, it developed the electrolytic tinning line as a successor to hot dipping and reduced tin consumption per base box from 1.5 lb to 0.5 lb.

• In 1949, it devised a highly efficient bulk milk handling system for dairy farms. Benefits: Improved sanitation, lower costs, and a vast new market for stainless pipe and storage containers.

Today, application research is part of the broad, consumer oriented marketing effort that recently launched Steelmark. Behind it is the realization that neither designers nor fabricators have a permanent loyalty to steel. Their allegiance is to the market they serve. In that arena, the public's discrimination and taste are decisive.

Take metal windows, for example. In no other area has the impact of nonferrous competition been greater. In 1947, 87 per cent of all metal windows were steel and 13 per cent were aluminum or bronze. Ten years later, 33 per cent were steel and 67 per cent were aluminum or bronze. The reversal was the result of intensive application research by the aluminum companies. They have continually developed improved designs, offering them to window manufacturers as guides to production of cheaper and better windows.

• **Meeting Challenge**—Recognizing that window manufacturers couldn't obtain similar service from most steelmakers, U. S. Steel established its first application research group (architectural) in January, 1958. Its initial assignment was to develop a stainless steel window for monumental buildings that would be competitive with aluminum. Result: A new design for a strong, rigid stainless window that could be roll formed from thin gage sheets. Although the stainless window ran into trouble when aluminum fabricators reduced their prices, steelmakers believe the new design makes stainless more competitive than previously and helps fill a need for a more economical window to be used in stainless curtain wall construction.

Mr. Paddock also told the Detroit engineers of a current project in which a 27 cu ft dump trailer is being redesigned from the tires up. Tire manufacturers have put steel cords into the tires to give them "fantastic life."

Built of carbon steel, such a trailer would weigh 10,600 lb, its aluminum counterpart, 8300 lb.

"But by using carbon, high strength, alloy steels, the weight is expected to go down to 9000 lb—approaching the weight of aluminum and still be much stronger and considerably cheaper."

On the next page are examples of other work being done. In addition, U. S. Steel is preparing a booklet on allowable design stresses for high strength and "T-I" steels.

• If you'd like to have a copy of this article, write to Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio. You may win $1000 by using material like this in* STEEL. *For details, see the Servicenter, Pages 5 and 6.*

Application researchers are asking designers these questions: Are you buying so many pounds of material, or are you buying certain engineering properties? How much allowable unit stress are you getting? How much efficiency? Have you been calculating the cost of the material or the cost of a function? Here are examples of where researchers are providing answers to such questions.

ARCHITECTURAL

Researchers have devised a strong, rigid stainless steel window that's roll formed from thin gage sheets. Application: Curtain wall buildings. They have preliminary designs (for homes) of an insulated carbon steel window with its own trim and are developing the "Steel-Fast" system of applying and finishing drywall sheets —the method cuts two days from home building schedules and saves lumber.

STRUCTURAL

Researchers are redesigning structures for the application of "T-1" high strength alloy steel. They include bridges, missile handling equipment, earthmoving machinery, sign bridges, and television towers. So far, they have designed drilling rigs and flatbed trailers that achieve weight savings similar to those of aluminum counterparts. In some cases, costs are said to be as much as 50 per cent less.

AUTOMOTIVE

Researchers are working on: Less costly stainless bumpers; better paint adherence on cold rolled sheets, possibly by changing coiling and annealing practices; lighter structural members for tractors and trailers; steel sheets with improved corrosion resistance. Detroit's unitized bodies are prompting fresh emphasis on structural integrity. Other research: Differentially coated and one-side-galvanized steel sheets.

RAILWAY

Researchers are helping carbuilders and owners lighten their equipment by redesigning underframes and car ends. Redesigning a 70 ton, Class 0-65 gondola car from copper bearing steel to high strength steel in reduced sections saves 6292 lb and $205.66. Where longer car life is the primary aim, replacement of copper bearing steel with high strength steel in the same thickness is being recommended.

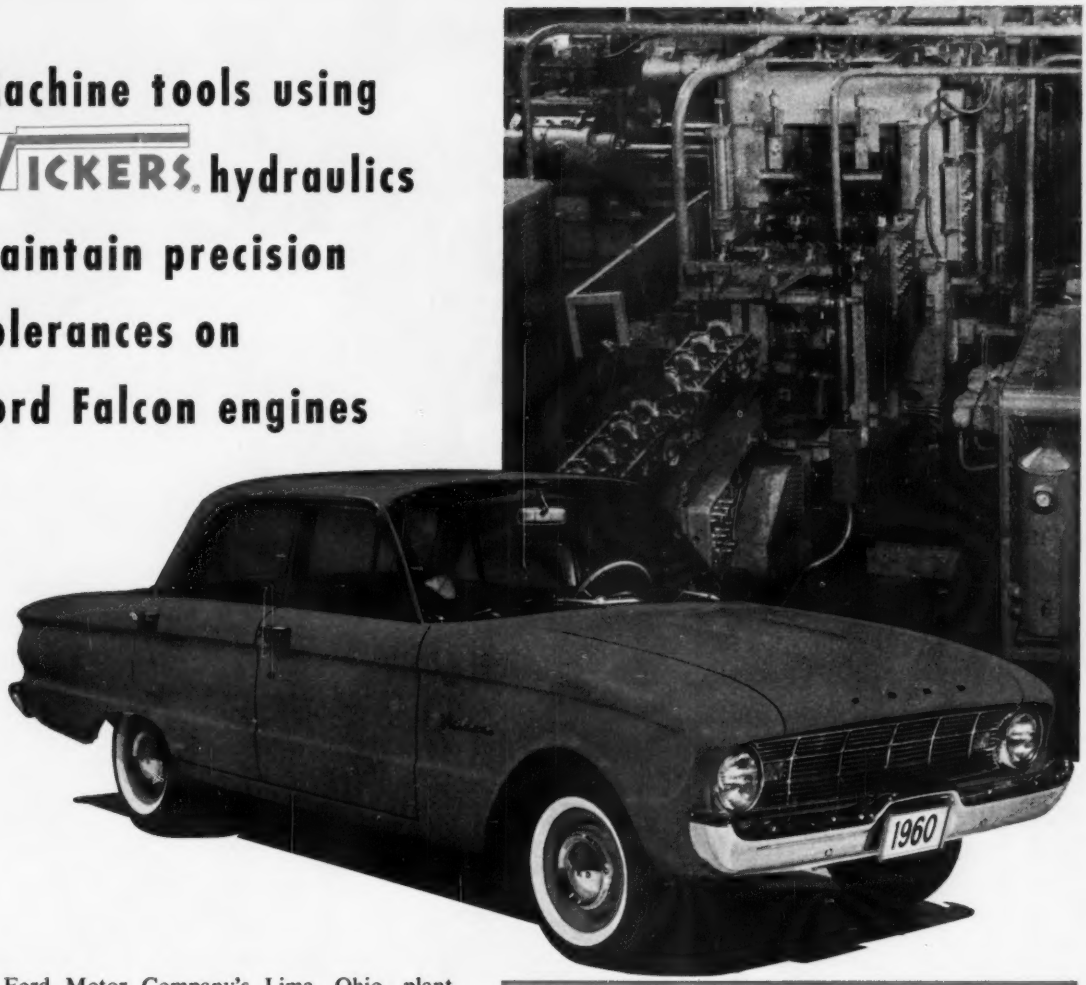
DOMESTIC

The most promising development to date: Lighter, thinner tin plate. Half as thick as customary can-making stock (see picture), it weighs 40 to 60 lb per base box vs. 75 to 100 lb for conventional plate. The light gages will give canmakers more material per ton and cut freight costs. Potential is also seen for disposable baking pans, detergent and paint cans, and frozen dinner trays.

NUCLEAR

In joint research with electrical equipment manufacturers, the corporation's nuclear application researchers are studying the effects of corrosion and atomic radiation on steel. In the nuclear, as in many of the other application areas, there are two aspects to the job of application research: New steels must be developed, and customers must be shown how to use them in new ways.

Machine tools using VICKERS hydraulics maintain precision tolerances on Ford Falcon engines



At Ford Motor Company's Lima, Ohio, plant you'll find the newest techniques and finest equipment being used to produce the six-cylinder, high efficiency, overhead valve engine developed specifically for the new Falcon. And, coincidentally, you'll find many of the machine tool builders have equipped their modern machines with Vickers hydraulics.

Modern production equipment and Vickers hydraulics just go together naturally. Machine builders and users know these pumps, motors and control elements can't be beat in design features and quality of manufacture.

You get "extra" planning help from sales engineers who are hydraulic specialists responsible for the products of a single manufacturer. Skilled technicians who are always near at hand assure better service, too.

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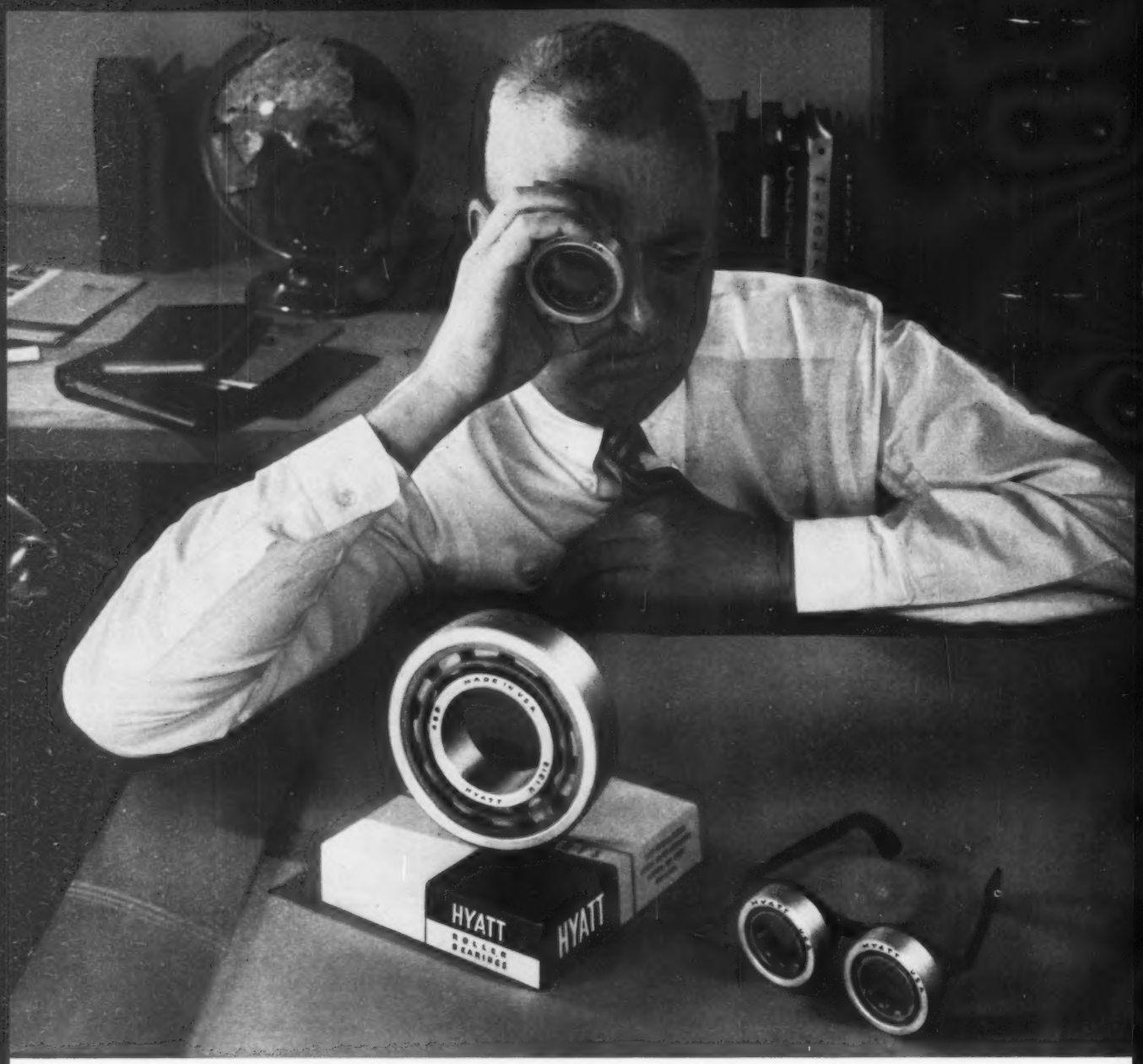
DIVISION OF SPERRY RAND CORPORATION
Machinery Hydraulics Division
DETROIT 32, MICHIGAN

8608

Machine tool builders using Vickers components at the Falcon engine plant

Apex Corporation
Bilt-Rite Tool Co.
Buhr Machine Tool Co.
Cen-Tec Division Centri-Spray Corp.
Colonial Broach & Machine Co.
The Cross Co.
Ex-Cell-O Corporation
Greenlee Bros. & Co.
Holcroft & Company
Industrial Metal Products Corp.
The Ingersoll Milling Mach. Co.
Kent-Owens Machine Company
H. R. Krueger & Co.
F. Jos. Lamb Co.
Landis Tool Company
LaSalle Machine Tool, Inc.
The R. K. LeBlond Mach. Tool Co.
Leland Detroit Mfg. Co.
Micromatic Hone Corporation
Morris Machine Tool Co.
The Motch & Merryweather Machine Co.
Snyder Corp.
Sundstrand Machine Tool Division of Sundstrand Corp.
Surface Combustion Division of Midland-Ross Corp.
Tocco Division The Ohio Crankshaft Co.
Turner Brothers
Wilson Automation Co.



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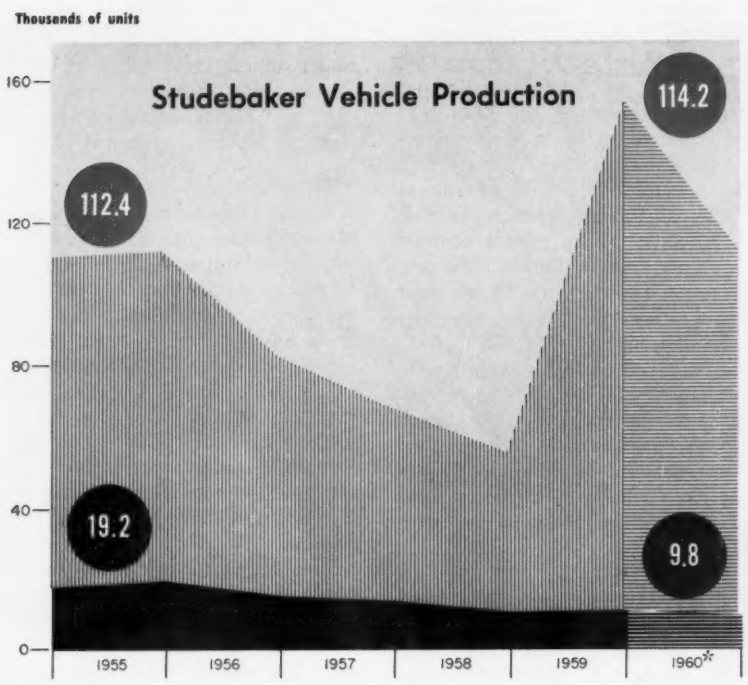

PASSENGER CARS

TRUCKS

*Projected from present rates.
Source: Ward's Automotive Reports

Studebaker Girds for Battle of Compacts

AUTODOM'S rumor mills are starting to spread the word that Studebaker-Packard Corp. will face another crisis this fall. The Lark already seems to be feeling the impact of Big Three compacts. It will be even harder pressed when it faces four new competitors in 1961.

But the South Bend automaker has displayed a remarkable ability for weathering crises. Management believes it can stand up against more competition, particularly in view of the expanding compact market.

In some respects, S-P's recent history parallels that of its direct competitor, American Motors Corp. Four years ago, both firms were caught with outdated product lines, overextended plant and equipment, labor disagreements, and cumbersome management teams. Worst of all, both firms still were trying to play the automotive game with Big Three rules.

AMC pulled out first. As early as 1955, George Romney was preaching the "compact" theme. At the same time, he started slashing overhead and rebuilding his management force. Rambler was ripe and ready when the '58 recession knocked the lid off economy car sales.

• **Slow Start**—Studebaker was not so well prepared. In late 1957, it still was sloughing off some of the debt ridden properties of the Packard group. The advisory agreement with Curtiss-Wright Corp. had not expired. Labor and management were just beginning to get their noses back in joint. The company was not quite ready to swallow its pride and admit that the Packard name no longer brought prestige sales.

Late in '57, S-P brought out the stripped down Scotsman station wagon. Its success led to the Lark's introduction in the fall of 1958 and the dropping of S-P's big cars. Sales in the last quarter were $88.6 million, almost equal to the total for the first nine months ($92 million).

Lark helped reduce S-P's 1958 net loss to $13 million. Last year, the company moved solidly into the black (helped by a $16 million tax credit) with net earnings of $28.5 million. Car sales totaled 133,000, a 160 per cent increase over the 1958 mark.

• **Picture Changes**—On a model run basis, the Lark's sales are still

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some 9000 units ahead of where they were this time last year—partly because the company kept operating during the steel strike. But Lark deliveries for the first 4½ months of 1960 total 41,160 against 48,635 for the same time last year. Production is being scheduled for only four days a week. First quarter income was $2.8 million, compared with $7.7 million last year.

Price has been blamed for some of S-P's troubles. At $1976 to $2196, Larks list at $72 more than comparable Falcons, but they're within $10 of the other compacts on a model for model price basis. Style and dealer penetration probably have more effect on the sales slump. S-P has 2500 dealers against Rambler's 3000 and Valiant's 1100. Falcon, Corvair, and Comet have more than 16,000 dealers pushing them in addition to the standard lines. These factors make motordom ask: "What will happen to Lark when Buick, Olds, Pontiac, and Dodge add their entries to the compact lineup?" One executive states Studebaker-Packard's answer this way: "The Lark will still provide a profit for the company. Our other activities will give us a broader and constantly expanding base for increased earnings."

• **Different philosophy** — Harold Churchill, S-P's president, has two strong convictions about the firm's future. 1. Studebaker-Packard has no intention of trying to compete against the entire auto industry on a model-for-model basis. 2. No matter how much it diversifies, its automotive division will continue to be the major source of income. The two objectives are not incompatible.

Says Mr. Churchill: "Our goal is a realistic objective, geared to our capacity and our product philosophy. Our vehicles are tailored for particular purposes and a particular segment of the entire market. The special consumer sections to which we direct our products, and for which we plan, are large enough and receptive enough to make reasonably certain that Studebaker-Packard's rather modest requirements for substantially profitable success can be met. After all, one of the virtues of a small company is its low breakeven point and high rate of profits once the breakeven is exceeded."

• **Needs**—Lark's breakeven point reputedly is around 112,000 units—less than 2 per cent of the expected 6.5 million domestic car sales and only 7 per cent of the sales that are expected to be in the compact arena where Lark participates. To get penetration, S-P is aiming at fleet and foreign markets as well as domestic. Fleet sales accounted for 8 per cent of Lark's 1959 production. They're now 15 per cent ahead of last year's output, the company reports.

S-P has licensing agreements to manufacture and assemble passenger cars and trucks in Chile, Israel, and Argentina. It's dickering for a similar setup in Ireland. It also has a Canadian subsidiary and other export arrangements with Mexico.

• **Allies**—Another source of income is S-P's subsidiary, Mercedes-Benz Sales Inc. It has an annual import quota of 12,000 Mercedes luxury and sports cars. The company reports it has 10,000 firm orders, needs only 2000 more to fill its 1960 quota. M-B Sales Inc. has also started importing the Auto Union-DKW lines of economy cars, starting around $1665. The smaller compacts sport front wheel drive, torsion suspension, and a valveless three cylinder engine, which requires a gasoline-oil fuel mixture.

All those operations now come under the direct control of A. J. Porta, S-P's executive vice president and newly appointed general manager of the Automotive Div.

• **Diversification**—To broaden the company's income base, William D. Mewhort, vice president-diversification, is seeking more firms and different products that can be tied into S-P's organization. Last year it acquired two plastics firms, Gering Products Div., Kenilworth, N. J., and C. T. L. Div., Cincinnati. It also tried for Oliver Corp., Chicago farm implement firm, but couldn't reach an agreement on stock exchanges. Recently, it bought Gravely Tractors Inc., Dunbar, W. Va. Gravely is a pioneer producer of self-propelled outdoor power tools for lawn, garden, farm, and commercial use. Its pretax earnings were $2.1 million last year. S-P sources figure the nonautomotive divisions will contribute 7 to 10 per cent of the firm's net income in 1960. It hopes to build the ratio to a quarter of total revenue by 1965. Whether it strives for more diversification may depend on what happens to the Lark in the next five years. The company won't necessarily stop at 25 per cent.

• **Outlook** — S-P has succeeded in weeding out most of its unnecessary overhead. It has firmed up some strong foreign markets, created a distributorship for luxury and economy import cars, and acquired what appears to be three solid companies in diversified and growing fields. It has programed a 20,000 unit Hawk buildup this year and plans to promote this sports type car much more heavily in 1961. Lark changes are fewer than the company suggests, but more than Detroit expected (see STEEL, May 9, p. 112). Major changes are planned for '62, say other STEEL sources. Fond hope: Someday, it may be able to revive the Packard name on a custom built, limited volume automobile that will compete with cars like Rolls Royce and Bentley. Meanwhile, it has a $15 million tax loss credit expiring this year and another $94 million to go.

U. S. Auto Output

	Passenger Only 1960	1959
January	688,731	545,757
February	659,323	478,484
March	654,242	576,085
April	582,909	578,825
4 Mo. Totals	2,585,205	2,179,151
May		546,817
June		557,994
July		555,418
August		239,152
September		258,157
October		507,530
November		254,527
December		494,931
Total		5,593,677

Week Ended	1960	1959
Apr. 16	135,402	135,934
Apr. 23	144,886	133,987
Apr. 30	135,515	118 059
May 7	142,091	134,763
May 14	151,328†	135,856
May 21	150,000*	133,568

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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N/D's new integrally sealed, heavy-duty conveyor ball bearing shuts out moist and dry abrasive contaminants . . . reduces assembly time and eliminates costly relubrication maintenance.

N/D Introduces New Heavy-Duty Cost-Cutting Conveyor Ball Bearing!

Now you can cut conveyor operating and assembly costs substantially with the *new* heavy-duty N/D conveyor roll ball bearing.

This durable N/D precision ball bearing for conveyors incorporates an exclusive integral seal combination—a new, highly efficient Land-Riding Seal and a performance-proved Sentri-Seal. Its minimum torque seal combination shuts out both moist and dry abrasive contaminants . . . and seals in bearing lubricant for life.

This high performance bearing helps cut manufacturing assembly time . . . and helps reduce field assembly costs. These modern design N/D ball bearings require no outmoded separate seal closures, lubricant plumbing, adjusting nuts, springs or collars . . . they're virtually maintenance free!

N/D sealed ball bearings are interchangeable with other type bearings and mount directly on commercially available rolled shafting. Install a few in your conveyor section . . . then compare the reduced maintenance costs to other type bearings requiring constant relubrication. The results will be convincingly in favor of N/D integrally sealed ball bearings . . . year after year!

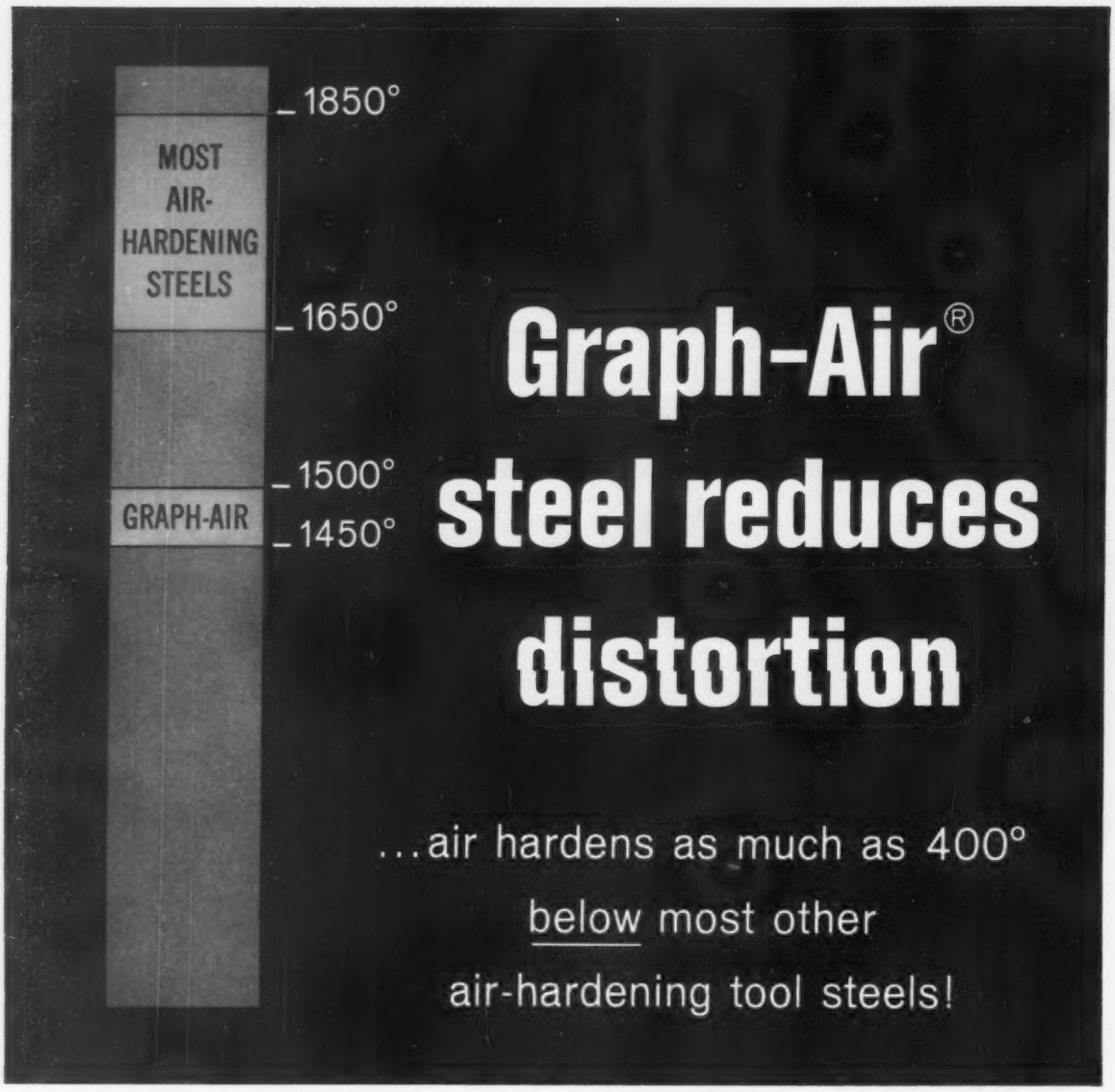
For additional information call your N/D Sales Engineer, or send today for the new N/D Heavy-Duty Conveyor Ball Bearing Bulletin. Write New Departure Div., General Motors Corp., Bristol, Conn.

Replacement ball bearings are available through United Motors System and its Authorized Bearing Distributors.

NEW DEPARTURE

BALL BEARINGS

proved reliability you can build around



You can simplify heat controls and reduce distortion in your heat-treated parts. Graph-Air® hardens at 1450°F.—as much as 400° below temperatures required for other air-hardening tool steels. And these lower temperatures also cut scaling and decarburization.

Graph-Air machines easier too, because of the free graphite in its structure. And because it contains diamond hard carbides throughout, it lasts and lasts—as much as three times as long as other tool steels. What's more, with its built-in stability, Graph-Air holds its accuracy better. It's one of the family of Timken graphitic tool steels, the most stable made.

If you're making intricate sections, you'll appreciate the reduced distortion of Graph-Air. It's ideal for blanking dies that must take a lot of punishment.

When you buy Timken steel you get . . . 1) Quality that's uniform from heat to heat, bar to bar, order to order. 2) Service from the experts in specialty steels. 3) Over 40 years experience in solving tough steel problems.

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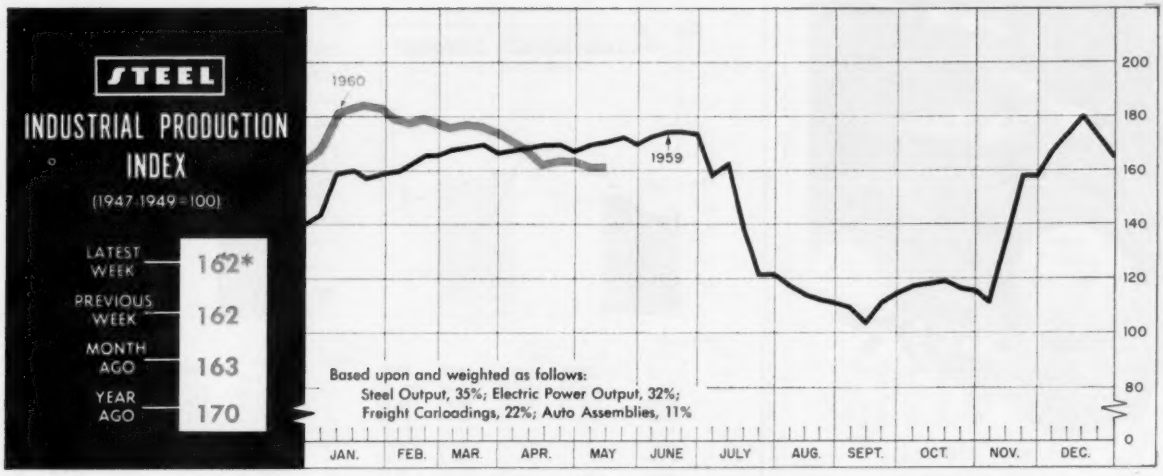
TIMKEN®
***Fine Alloy* STEEL**

TIMKEN GRAPHITIC STEELS ARE CARRIED IN STOCK BY 9 DISTRIBUTORS WITH 47 WAREHOUSES IN 39 CITIES IN THE UNITED STATES AND CANADA



*Week ended May 14.

Stability to Mark Near Future

ONLY 3 POINTS have separated the high and low points in STEEL's industrial production index in the last five weeks. The situation spells stability, and stability is likely to be the predominant feature of many over-all business indicators in the weeks immediately ahead.

There is little indication that either the plus or minus factors in today's business picture will be strong enough during the mid-months to pull the trend line much off its present course. It means that the upturn often associated with the second quarter probably won't materialize. But it also means that the slump expected every summer may be a little less than usual.

• **Tug of War**—Take the components of STEEL's index. The biggest single influence in the last five weeks has been the persistent decline in steel operations. Ingot output dropped from 2,225,000 net tons during the week ended Apr. 17 to 2,102,000 tons in the week ended May 15. (It declined again during the latest week of May 22. See Page 171.) The drop accounts for 3 points in the index. During most of the period, the output of electricity also declined seasonally, accounting for another 2 point loss.

But at the same time, auto production has been on the uptrend in response to strong dealer sales, and railroad freight carloadings have been stronger because of the resumption of iron ore loadings. Those two factors have nearly offset the declines.

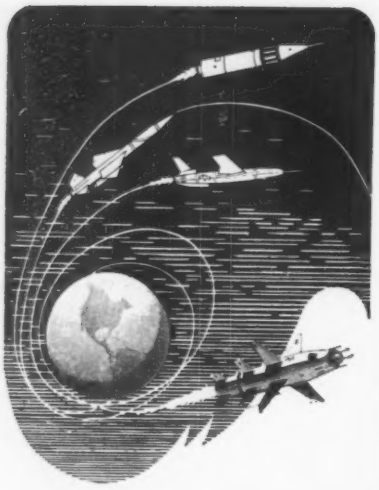
• **Where Next?**—If steel industry spokesmen are correct, the steel operating rate is likely to decline farther before some semblance of stability arrives. But the downtrend will not be as severe as it has been in recent weeks.

C. M. White, chairman of Repub-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,042[1]	2,102	2,644
Electric Power Distributed (million kw-hr)	13,200[1]	13,139	12,684
Bituminous Coal Output (1000 tons)	8,280[1]	8,300	8,457
Crude Oil Production (daily avg—1000 bbl)	6,700[1]	6,771	7,178
Construction Volume (*ENR*—millions)	$385.8	$530.4	$420.5
Auto, Truck Output, U. S., Canada (*Ward's*)	191,114[1]	181,626	172,659
TRADE			
Freight Carloadings (1000 Cars)	645[1]	642	694
Intercity Truck Tonnage (changes from year ago)	−2.0%	−2.4%	+18.8%
Business Failures (Dun & Bradstreet)	327	325	265
Currency in Circulation (millions)[3]	$31,723	$31,603	$31,505
Dept. Store Sales (changes from year ago)[3]	−1%	+7%	+14%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$24,557	$29,905	$22,992
Federal Gross Debt (billions)	$288.6	$288.8	$287.1
Bond Volume, NYSE (millions)	$26.1	$24.3	$30.0
Stocks Sales, NYSE (thousands of shares)	15,421	13,956	18,115
Loans and Investments (billions)[4]	$103.0	$103.1	$102.1
U. S. Govt. Obligations Held (billions)[4]	$259	$26.0	$31.5
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	230.9	230.7	222.4
All Commodities[7]	119.9	119.8	119.7
Commodities Other than Farm & Foods[7]	128.4	128.4	128.1

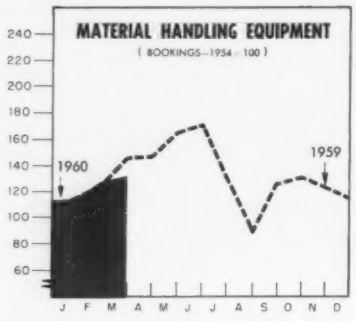
*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,844,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.



Ideas
orbit successfully on TMI tubing

In this fast-moving world, the accomplishments of almost every phase of the metalworking industry is linked inseparably with performance of stainless steel or special alloy tubing. *That's why the TMI mark of quality travels in such good company.* It gets good ideas of design and production engineers off the launching pad and successfully into orbit with regularity . . . in instrumentation, aviation, nuclear development, space exploration and endless thousands of applications where small diameter tubing (.050″ to 1.250″ O.D.) must be drawn to tolerances as close as .0005″.

THE BUSINESS TREND



	1960	1959	1958	1957
Jan.	114.96	115.84	93.07	126.34
Feb.	128.74	124.77	93.49	139.29
Mar.	133.60	146.36	97.89	140.76
Apr.	.....	147.28	122.36	132.67
May	.....	164.45	118.04	157.95
June	.....	170.72	131.15	121.57
July	.....	130.26	134.34	128.31
Aug.	.....	87.02	104.46	110.09
Sept.	.....	126.43	85.41	116.79
Oct.	.....	131.09	111.35	124.80
Nov.	.....	124.16	110.88	87.80
Dec.	.....	113.78	105.97	105.65
Avg	.....	131.85	109.87	124.34

Material Handling Institute Inc.
Charts copyright, 1960, STEEL.

	1960	1959	1958	1957
Jan.	243.4	218.6	174.5	259.3
Feb.	278.6	199.9	179.1	239.5
Mar.	231.8	234.3	173.7	262.4
Apr.	....	255.6	153.2	221.7
May	....	241.0	142.2	263.2
June	....	274.2	173.8	215.9
July	....	262.8	133.3	211.4
Aug.	....	213.3	162.1	225.8
Sept.	....	213.9	170.7	174.9
Oct.	....	230.5	175.9	207.0
Nov.	....	208.7	182.7	165.3
Dec.	....	233.9	145.5	150.8
Avg	....	234.7	163.9	216.4

American Gear Mfrs. Assn.

lic Steel Corp., feels that the decline in his company's business is near bottom. A. S. Glossbrenner, president of Youngstown Sheet & Tube Co., says some second quarter business is being pushed over into the third quarter, assuring that period of better business than expected a while back.

• **Some Upturns**—Output of electricity will show a general upturn in the weeks leading up to midsummer's heat. Only unseasonably cool weather will interrupt that trend. However, the gains in this industry over the year-ago period are likely to be held to a minimum for two reasons: 1. Consumption last spring was unusually high because of the rapid comeback from the recession and the buildup of the steel industry prior to its strike. 2. General industrial activity, while good, will not be increasing at nearly the year-ago rate.

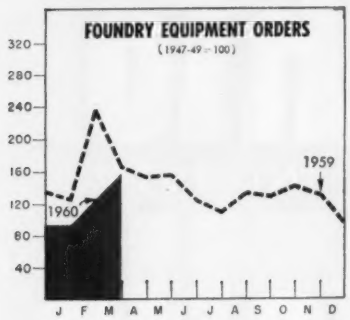
There may be further increases in freight carloadings, but, so far, there is no indication of a dramatic upsweep. Shipments of goods have been somewhat less than anticipated.

Auto and truck output, which climbed to a 12-week high in the week ended May 14, can be expected to remain at about the 175,000 to 180,000 unit level for the next few weeks. Automakers are banking on a continuation of the sales spree that dates back to late March. Twice since mid-April, production schedules for the second quarter have been boosted by about 3 per cent, says *Ward's Automotive Reports.* Estimated output is 1,838,200 units, the best second quarter since the peak year of 1955.

Credit Head Sees Standoff

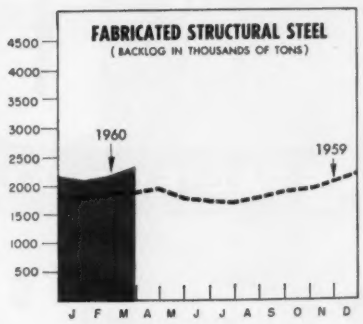
Edwin B. Moran, executive vice president of the National Association of Credit Management, supplies further evidence of stability along with encouragement for the future. In toting up what he considers the favorable and unfavorable aspects of the economy, he comes up with a tie: 22 good vs. 22 not so good.

He adds: "With companies spending liberally for labor-saving machinery and equipment, and with factory shipments up, new orders received by manufacturers have climbed and regained most of the ground lost in the first two months of the year. Consumers continue to



	1960	1959	1958
Jan.	95.5	127.4	57.9
Feb.	128.6	237.1	57.6
Mar.	159.9	166.6	85.9
Apr.	....	154.2	88.7
May	....	157.0	136.1
June	....	125.1	87.7
July	....	110.7	77.9
Aug.	....	134.1	74.1
Sept.	....	131.3	64.5
Oct.	....	140.8	118.9
Nov.	....	131.2	83.3
Dec.	....	95.9	137.0
Avg	....	142.6	89.1

Foundry Equipment Mfrs. Assn.



	Shipments 1960	Shipments 1959	Backlogs 1960	Backlogs 1959
Jan.	209.0	224.3	2,116	1,794
Feb.	240.9	216.1	2,189	1,864
Mar.	277.0	260.5	2,364	1,873
Apr.	....	290.6	....	1,922
May	....	294.1	....	1,768
June	....	365.4	....	1,717
July	....	238.6	....	1,679
Aug.	....	220.4	....	1,772
Sept.	....	182.6	....	1,871
Oct.	....	195.3	....	1,891
Nov.	....	180.8	....	2,068
Dec.	....	235.7	....	2,195
Total	....	2,904.4		

American Institute of Steel Construction.

buy substantially in expectation of good times. Look for seasonal slackening during the summer months but for skies to clear for favorable business in the fall."

Some Upturn in Evidence

Even though the countertrends will probably cancel each other, some spring upturn is occurring in enough industries (three out of four components in STEEL's index) to indicate that the economy is still in pretty good condition.

States the Morgan Guaranty Trust Co. of New York: "Events of the past month suggest that the underlying business situation is stronger and more resilient than it sometimes appeared to be during storm-ridden February and March." It cites particularly the spurt in retail buying and indicates that the momentum gained during the Easter season has continued. In addition to the gain in new car sales, it points out the rise in used car interest. Construction has also perked up.

And the First National City Bank of New York asserts that the lower rate of inventory accumulation, which is responsible for much of the slower than expected pace of industry, "simply means that business is not in an inventory-building boom. The corollary: It is less vulnerable to sudden contraction."

Spending on Schedule

Reports from two heavy equipment industries recently indicate that business spending plans are on schedule. Producers of industrial heating equipment signed $12,464,000 worth of new orders in April, up 38 per cent from March's $9,033,000. For the first four months of 1960, net new orders are up 14 per cent compared with the pace in the corresponding period of 1959, says the Industrial Heating Equipment Association Inc.

Data compiled by the Material Handling Institute Inc. show that March bookings topped those of every month since June, 1959. At 133.6 per cent (1954=100), the institute's index has climbed for three consecutive months. "Business in our industry thus far this year is running better than we anticipated," states C. L. Fell, institute president and vice president-marketing, American MonoRail Co., Cleveland.

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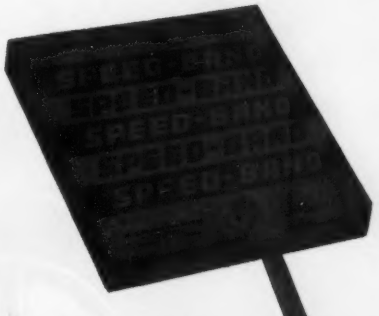

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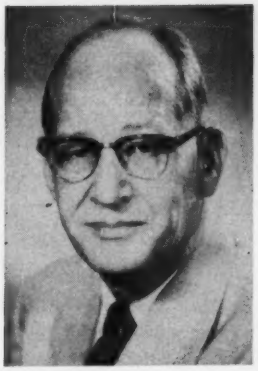


ERVIN L. DAHLUND
heads Fairbanks, Morse group

Kinsey S. Dickel was named purchasing agent for **John A. Roebling's Sons Div.**, Trenton, N. J., Colorado Fuel & Iron Corp. **Joseph G. Hottinger** was named assistant purchasing agent.

Stanley G. Fisher was made general sales manager, **Fafnir Bearing Co.**, New Britain, Conn. He was vice president-general sales manager of Landers, Frary & Clark and its subsidiaries.

Raymond E. Jones was appointed sales manager for **Matthews Corp.**, Hawthorne, Calif. He was with Earle M. Jorgensen Co. in sales and management posts.

C. W. Beck, general manager of **Pfaudler Co.**, division of Pfaudler Permutit Inc., Rochester, N. Y., was elected vice president of the company.

Frank Coolbaugh was elected president, **American Metal Climax Inc.**, New York. **Walter Hochschild** was elected chairman and chief executive officer to succeed **Arthur H. Bunker**, retired. Mr. Bunker was elected an honorary chairman and chairman of the executive committee.

C. L. Parkhill Jr. was made general sales manager, **Pacific Wire Rope Co.**, Los Angeles.

Melpar Inc., subsidiary of Westinghouse Air Brake Co., appointed **Dr. David Van Meter** manager, and **John W. Gerdes** assistant manager of its Applied Science Div., Watertown, Mass.

Republic Steel Corp., Cleveland, elected **Ernest R. Johnson** assistant president and first vice president. **Harry L. Allen** was elected vice president-operations succeeding Mr. Johnson. **Charles W. Cravens** was made assistant vice president in charge of steel plant operations, and is succeeded by **Robert P. Carpenter** as manager of the Cleveland District. Mr. Carpenter was manager, Buffalo District.

J. Bishop & Co., Platinum Works, Malvern, Pa., appointed **Walter H. Braun** chief metallurgist for all divisions. He was supervisor of quality control in the Stainless & Strip Div. of Jones & Laughlin Steel Corp., Detroit. **Dr. James B. Hunter** was named to the new post of manager of chemical development in the Precious Metals Chemical Div.

Robert C. Dickey was made vice president-general manager, **Coated Abrasives Inc.**, Detroit. Former plant manager at Michigan Abrasive Co., he remains on that company's staff as manufacturing processes consultant.

Donald K. Marsh was appointed general sales manager, **Greer Hydraulics Inc.**, with offices in Los Angeles (new headquarters). **Leonard H. Seeman** was named sales manager, Products Div., in the Eastern offices in Westbury, N. Y.

James W. Hopper was named assistant to the president, **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He continues to represent company interests in Washington.

Ervin L. Dahlund was made general manager at Beloit, Wis., for **Fairbanks, Morse & Co.'s** DCL Group (diesel engines, compressors, locomotives). He joined the firm at Beloit in 1936. He left in 1956 to become director of engineering for the Albuquerque Div. of ACF Industries Inc.

Robert H. Garretson was made executive vice president of **Consolidated Electrodynamics Corp.**, Pasadena, Calif., subsidiary of Bell & Howell Co. He joined CEC last December as group vice president responsible for the four data processing divisions. He previously spent 19 years with International Business Machines Corp.

Alden T. Bloxham was made manager of fan sales, Industrial Div., **Joy Mfg. Co.**, with headquarters in Pittsburgh.

W. C. Newberg, executive vice president since 1958, was elected president and chief operating officer of **Chrysler Corp.**, Detroit. He succeeds **L. L. Colbert**, elected chairman, chief executive officer, and chairman of the finance committee. **William C. Cawthon** was made director-corporate purchasing staff, succeeding **E. Lloyd**, appointed executive assistant to **B. W. Bogan**, Chrysler vice president, who heads the recently consolidated corporate manufacturing staff and related activities.

William F. Boyle was elected a vice president of **General Metals Corp.**, Oakland, Calif. He joined the firm in January, having previously been

E. M. KLINE

L. E. GRUBB

Huntington Alloy Products vice presidents

J. RALPH DYE

W. CLIFFORD MORRISON

Milton Steel works mgr. and general manager

an executive of Baldwin-Lima-Hamilton Corp.

E. M. Kline was elected vice president-operations and **L. E. Grubb** vice president-sales of the **Huntington Alloy Products Div.** of International Nickel Co. Inc., New York. The election of **John A. Marsh** as president of the division was recently announced. **G. K. Crosby** becomes assistant vice president-administration, **J. M. Weldon** assistant vice president-sales, and **J. E. Carter** assistant vice president-manufacturing.

D. L. Van Orman was made Philadelphia district manager, Industrial Div., **Timken Roller Bearing Co.** He is succeeded as Minneapolis district manager for the division by **R. P. Clemmer.**

J. A. Bauscher joined **Lee Wilson Engineering Co. Inc.**, Cleveland, as vice president-research. He was chief of the Sheet Products Div. of U. S. Steel Corp.'s Applied Research Laboratory.

J. Ralph Dye was promoted to works manager and **W. Clifford Morrison** to general manager of **Milton Steel Div.**, Milton, Pa., Merritt-Chapman & Scott Corp. **Charles R. Arbaugh** retired as general manager, continuing in a consulting capacity. **Bruce R. Deckard** was promoted to assistant to the general manager.

R. Hoe & Co. Inc., New York, elected **Roy N. Propst Jr.** assistant vice president, in charge of the Saw Div.'s West Coast operations.

Thomas M. Hogan succeeds **Park B. Turner**, retired, as manager of **Jones & Laughlin Steel Corp.**'s export sales office in New York.

James R. Wescott was named to the new post of vice president-marketing, **Gabriel Electronics Div.**, Millis, Mass., Gabriel Co.

Joseph Epstein was appointed vice president-manufacturing and engineering, **Patterson Foundry & Machine Co.**, East Liverpool, Ohio. He was vice president of Perry Products Co., Philadelphia.

Lawrence L. Garber, vice president of **Electric Autolite Co.**, Toledo, Ohio, was appointed to the president's staff to work principally in the areas of manufacturing, properties, and capital equipment. He formerly headed the company's Battery Div.

Edward W. Ruhe fills the new post of chief engineer, Engineering & Maintenance Dept., of **Olin Mathieson Chemical Corp.**'s Metals Div. plant at East Alton, Ill. He is succeeded as Roll-Bond manager by **Charles O. Kunz.**

John L. Ellis was appointed vice president of **Chromalloy Corp.** He was also named general manager of its Sintercast Div., Yonkers, N. Y. Mr. Ellis was with Sintercast Corp. of America from its founding in 1947 until recently when it was acquired by Chromalloy.

William L. Rogers was made vice

J. A. BAUSCHER

joins Lee Wilson Eng.

JAMES R. WESCOTT

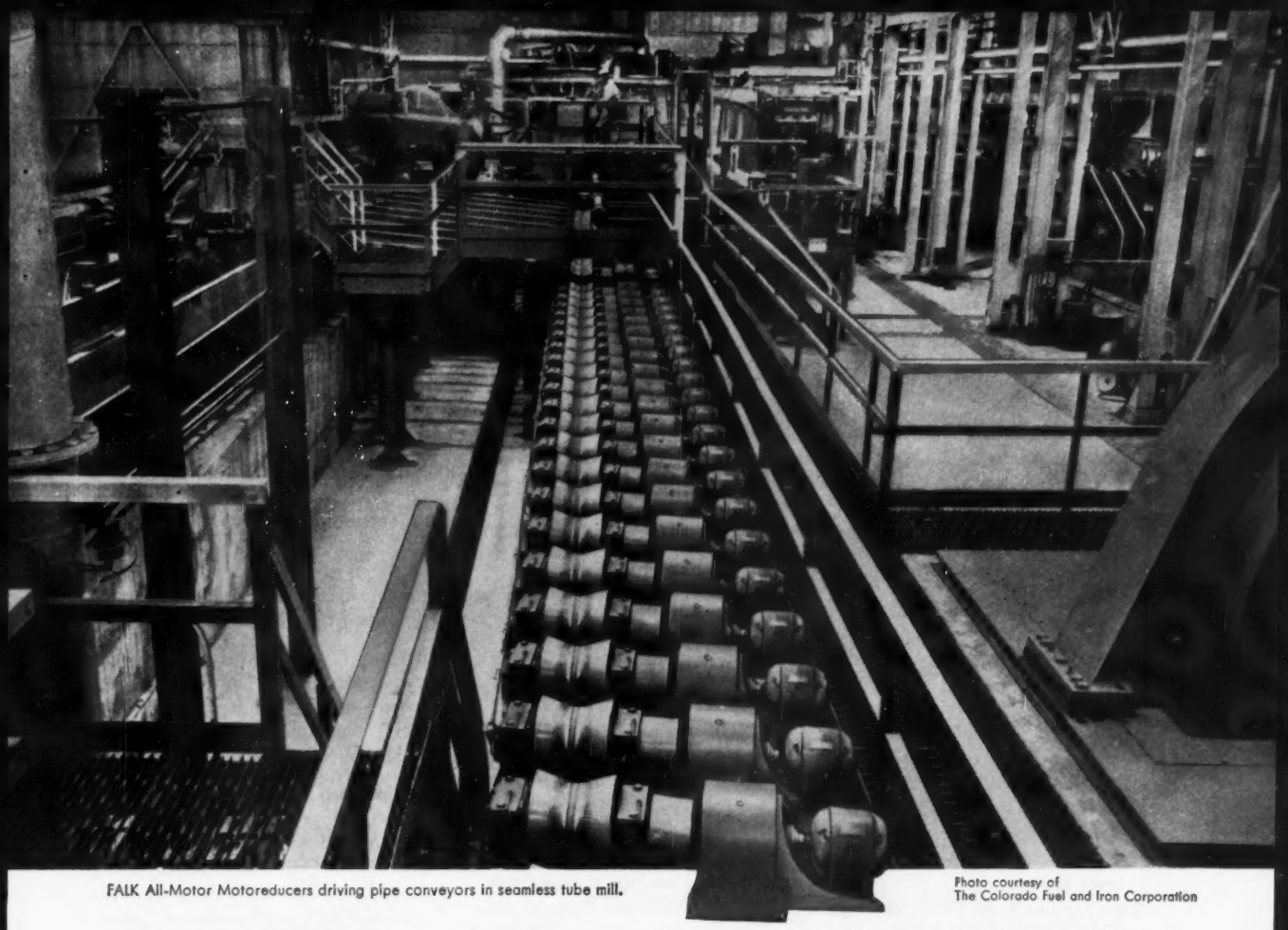
Gabriel Electronics marketing

JOSEPH EPSTEIN

Patterson Foundry v. p.

JOHN L. ELLIS

Chromalloy v. p.



FALK All-Motor Motoreducers driving pipe conveyors in seamless tube mill.

Photo courtesy of
The Colorado Fuel and Iron Corporation

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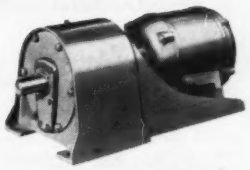

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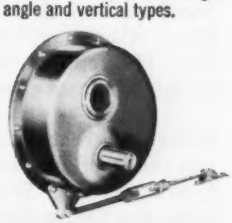

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W. GORDON JARVIS
Hydreco manufacturing mgr.

JOHN G. ZEIGER
Taft-Peirce marketing dir.

JOHN H. PAUTZ
Globe-Wernicke v. p.

C. P. SANDER
Consolidated Western post

WILLIAM S. VanDALSON
Kalamazoo Stamping v. p.

president of the Azusa, Calif., plant of **Aerojet-General Corp.**

John H. Pautz was elected vice president of **Globe-Wernicke Industries Inc.**, Toledo, Ohio, and general manager of its City Machine & Tool Div. He succeeds **Peter Peterson**, retired May 1 after heading City Machine for many years.

A. L. Vits, former executive vice president, was elected president of **Mirro Aluminum Co.**, Manitowoc, Wis. He succeeds **W. F. Bugenhagen**, appointed chairman.

Robert E. Schroeder was elected vice president in charge of the Ohio District of **Luria Bros. & Co. Inc.**, division of Ogden Corp. Mr. Schroeder resides in Cleveland.

Marcus Transformer Co., Rahway, N. J., promoted **Leonard J. Siegal** to sales manager.

J. J. Fitzgibbon was made sales manager of the Harrison, N. J., office of **Whitehead Metals Inc.**

C. P. Sander was made general superintendent, Los Angeles District, for U. S. Steel Corp.'s **Consolidated Western Steel Div.**, and **Harold C. Seiler** was made assistant general superintendent. **John J. McNerney**, former general superintendent of the Maywood plant, was named assistant to the vice president-production, Los Angeles District.

William S. VanDalson was made acting vice president of **Kalamazoo Stamping & Die Co.**, Kalamazoo, Mich.

William F. Franke was made New York district manager, **Aluminum Foils Inc.** He was Cleveland district manager, and is succeeded by **Jack Hobbs.**

Ralph P. Kimmel was appointed assistant general superintendent of **U. S. Steel Corp.'s** Johnstown, Pa., Works. He is succeeded by **William N. Pauley** as division superintendent of foundries. Mr. Kimmel succeeds **Willard U. Taylor**, resigned.

Eugene A. March, former assistant works manager at the **Crucible Steel Co. of America's** Midland plant, was appointed director of metallurgy for the company in Pittsburgh. He succeeds **E. T. Walton** who retires in June. **Lawton Howell** succeeds Mr. March at the Midland Works.

W. Gordon Jarvis was appointed manager of manufacturing, **Hydreco Div.**, New York Air Brake Co., Kalamazoo, Mich. He was manager of quality control.

John G. Zeiger was named to the new post of director of marketing at **Taft-Peirce Mfg. Co.**, Woonsocket, R. I. He was with Management Development Associates, New York. Previously, he was sales manager of Koehler Mfg. Co.

Arthur C. Reppenhagen Jr., sales manager, and **Harlow G. Jones**, director-research and product development, were elected vice presidents of **Mid-West Abrasive Co.**

Nylok Corp., Paramus, N. J., elected three vice presidents. **Bryan Steele** was named vice president-Western operations. He was manager of manufacturing facilities at El Segundo, Calif., and continues to operate from plant headquarters there. **James H. Trebilcock**, manager of the Skokie, Ill., plant, was named vice president-Midwest operations. **John W. Brightman** was named vice president-manufacturing at Paramus.

OBITUARIES...

Augustus S. Blagden, 80, chairman, **Federal Machine & Welder Co.**, Warren, Ohio, died May 10.

W. R. Moore, retired vice president, **Norton Co.**, Worcester, Mass., died May 10 in Clearwater, Fla.

William J. Greene, retired vice president and director of sales, **L. S. Starrett Co.**, Athol, Mass., died Apr. 26 in Shreveport, La.

James M. Knox, 56, vice chairman and former president, **Research-Cottrell Inc.**, Bound Brook, N. J., died May 9.

Wylie Brown, 82, chairman, **Hydropress Inc.**, New York, and former president of Phelps Dodge Copper Products Corp., died May 15.

View of One Bay in the New Research Building Showing the Continuous Strip and Bell Furnaces.

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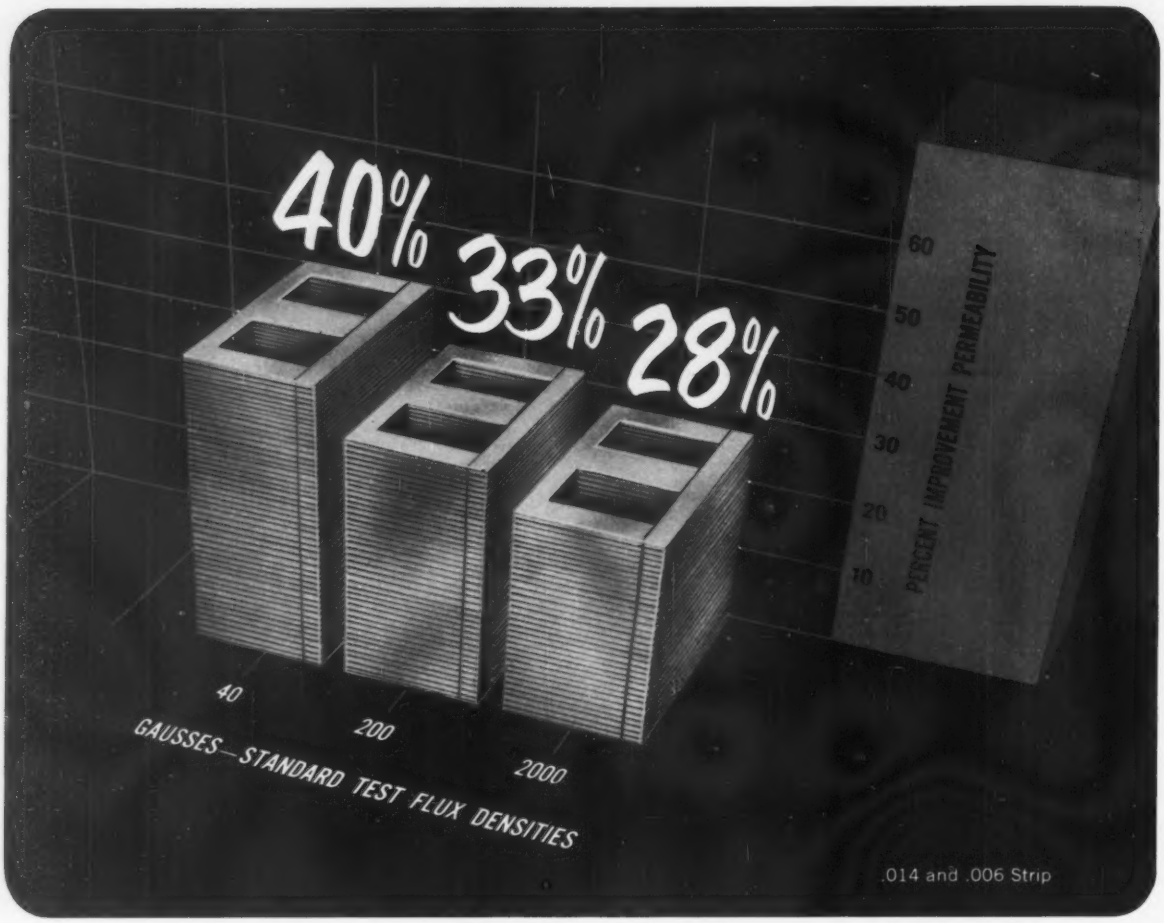

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CF&I, Inland, Copperweld Start Expansion Projects

STEEL PRODUCERS continue to expand and improve their facilities to meet the growing demands of their customers and to increase the efficiency of their operations.

Colorado Fuel & Iron Corp., Denver, has started construction of an $8 million plant, while Copperweld Steel Co. has embarked on a $3 million expansion program at Shelby, Ohio. Inland Steel Co., Chicago, is revamping its No. 2 electrolytic tinning line at its Indiana Harbor steel plant in East Chicago, Ind.

• **CF&I Oxygen Converter**—The plant being built at Pueblo, Colo., will enable the company to make steel within 30 to 60 minutes compared with 7 to 10 hours via the open hearth process. It will have a monthly capacity of about 70,000 ingot tons. Present steelmaking capacity at the Pueblo plant is about 150,000 tons a month, all of it produced by the open hearth process.

Each of two processing vessels will weigh 310 tons and will have a 100 ton capacity. One vessel will be operated at a time; the other will take over when its twin's brick lining shows signs of wear. Linings are expected to last about 250 heats. Once a vessel has been filled, its charge will be heated to 2900° F with an oxygen flame. The facility will require from 1800 to 2000 cu ft of oxygen per ton of steel produced.

Construction of the oxygen converter is part of a $21 million expansion and modernization program underway at CF&I plants across the country.

• **Copperweld Tube Mills**—The $3 million program at Ohio Seamless Tube Div., Copperweld Steel Co., at Shelby, Ohio, will double the firm's production capacity for welded tubing and seamless steel tubing product lines. The new mills will produce both round and special shaped welded tubing in heavier wall thicknesses and in diameters up to 7.5 in., says Reid M. Pittenger, vice president in charge of Ohio Seamless.

A major step in the program was taken May 3 when Ohio Seamless awarded a contract to McKay Machine Co., Youngstown, for two electric weld tube mills and auxiliary processing and handling equipment (STEEL, May 14, p. 141). Contracts for a building to house the new mills are expected to be awarded before the end of this month.

In the new installation, hot rolled, mill edge skelp or hot rolled pickled and oiled skelp is to be used in coiled form in either single or multiple band widths. The slitting line can run at 350 fpm.

The mills will include forming, welding, and sizing units and flying cutoff machines to produce the required lengths. Features also include power decoiling equipment and an underfloor self-threading looper for continuous mill operation at speeds up to 200 fpm.

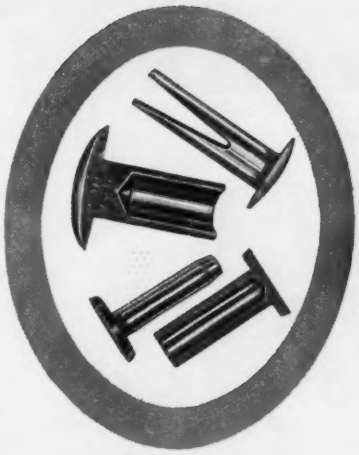
Two of the company's welded tube mills are to be modernized. Additional improvements are scheduled for seamless steel tube facilities.

• **More Inland Coils**—The No. 2 electrolytic tinning line at Inland Steel's Indiana Harbor plant, East Chicago, Ind., is being revamped to enable the firm to process two-thirds of its tin plate output in coils.

The project is the second undertaken by Inland to increase its output of tin plate in coils. Construction of a third electrolytic tinning line (expected monthly capacity, 14,000 tons) was started last year; it is scheduled to go into production late this summer.

The revamped No. 2 line will have a capacity of 11,000 tons a month. The No. 1 line will continue to produce tin plate in sheets. Following expansion and conversion of its tin plating facilities, Inland's annual production capacity of tin

(*Please turn to Page* 118)



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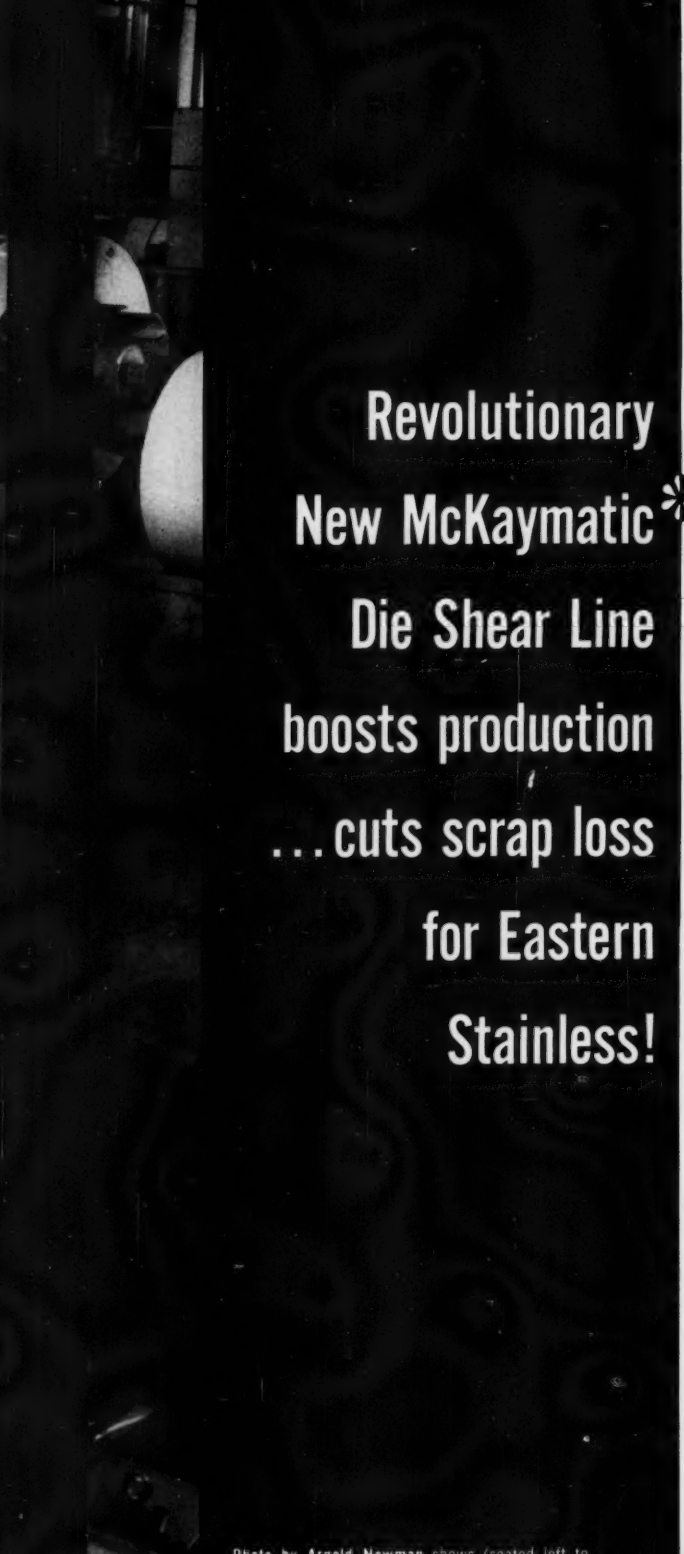


Revolutionary New McKaymatic* Die Shear Line boosts production ...cuts scrap loss for Eastern Stainless!

Photo by Arnold Newman shows (seated left to right) W. F. Schneid, vice president—general manager, and H. J. Verner, chief engineer of Eastern Stainless Steel Corp., discussing cost reductions in stainless steel processing with (standing) McKay Machine sales engineer, Robert D. Lynn; in front of a McKaymatic* Die Shear Line recently installed in Eastern Stainless' cold strip department

"We consider the McKaymatic* the finest advancement in shearing to come along in a great many years," says W.F. Schneid, vice president-general manager, of Eastern Stainless Steel Corporation, Baltimore, Md. "We have reduced production time, cut our scrap loss, and have recorded an overall increase in department efficiency as a direct result of this new McKay die shear line," Mr. Schneid continues.

Eastern Stainless is a prime supplier of stainless steel sheets, strip and plates, for aircraft and missile parts, for food, chemical, paper and textile machinery and for architectural uses. It produces 25 grades of stainless steel in its own modern electric furnace facilities, and ships about sixty-six percent of it in sheet form.

Programs many grades instantly—Through improved roller leveler techniques, Eastern Stainless found it was able to instantly program many grades of sheet through its new McKaymatic* Die Shear Line. The line decoils, levels in a 17-roll McKay Roller Leveler, measures by electronics and cuts to length—replacing a cut-up, re-level, and re-square operation prior to boxing. Production of cut lengths has been substantially increased.

The result, they report, is cost savings. Says Mr Schneid: "As a result of our efforts to improve customer service, we installed this line to speed up production of these cut lengths. It has enabled us to break a production bottleneck for which there seemed to be no solution."

Line eliminates stretcher leveling—Mr. Schneid continued that production time has been reduced on sheets of five grades as a result of being able to eliminate stretcher leveling and re-squaring procedures. Also, he said, the scrap loss on re-squaring has been eliminated as the sheets are cut clean and square on the McKay line. Net effect of the installation was a definite increase in overall departmental efficiency.

H. J. Verner, chief engineer, remarked that the McKay roller leveler could process these grades of stainless, within its capacity, to flatness approaching that obtained from the stretcher method. He reported that the Die Shear Line is being used to prepare for shipping cold rolled sheet from 4" to 48" in width, up to .050" in thickness, and in lengths from 36" and greater at normal production speeds. He particularly likes the McKaymatic* Die Shear Line for its ability to handle high finish stainless without edge or surface damage.

Available in many sizes—The McKaymatic* Die Shear Line is available in sizes to accommodate most commercial widths. Composed of decoiler (with coil car, if desired), roller leveler, measuring device, and cutoff press, it satisfies most requirements for sheet length accuracy and squareness, flatness, edge and surface quality protection and output rate.

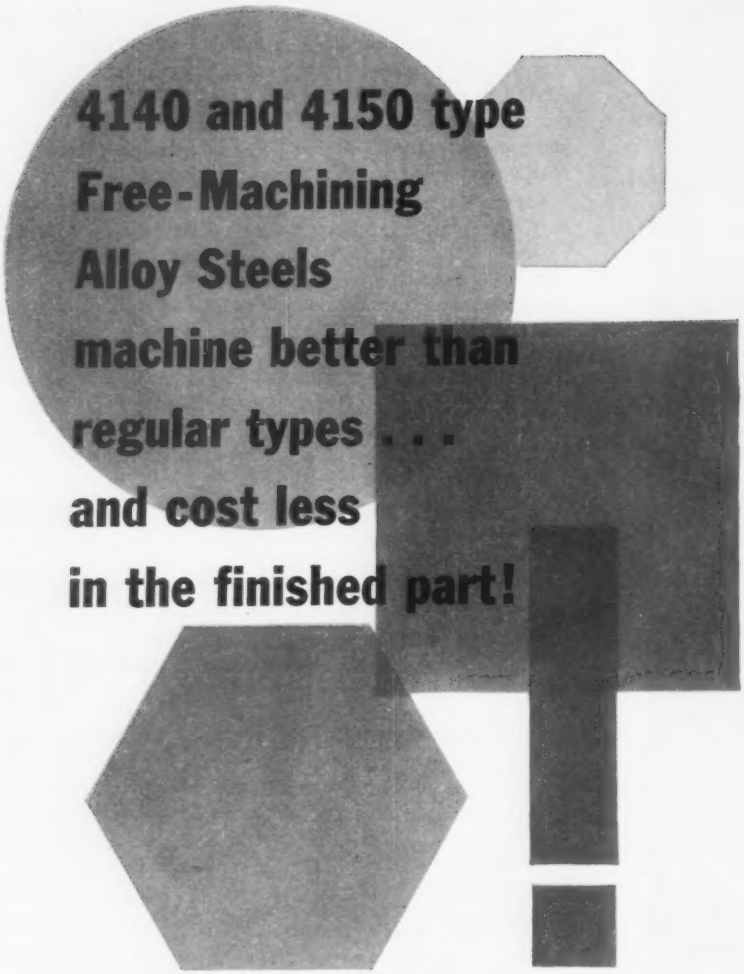
For short runs or long, the McKaymatic* Die Shear Line will better any other line in economy and efficiency. Whatever your cut-to-length problem, McKay Machine's engineers have a solution. Write for literature; send your specific needs for a quotation to *McKay Machine Company, Youngstown 1, Ohio.*

*TM

LOOK TO

McKAY MacK MACHINE

FOR PROGRESS IN METAL PROCESSING



Wheelock, Lovejoy is your best source of 4140 and 4150 type free-machining alloy steels, the easy-working steels that machine far better than regular type steels, and which cost *less* in the finished part.

Wheelock, Lovejoy, for many years the pioneer in the development and application of 4140 and 4150 type free-machining alloy steels, offers you the most extensive stocks anywhere, in all W-L warehouses.

Available variety of 4140/50 type free-machining stock includes round, square, flat, billets, and forgings to specifications.

For best stocks, best service, get in touch with your nearest Wheelock, Lovejoy warehouse.

W-L STEEL SERVICE CENTERS – Cambridge • Cleveland Chicago • Hillside, N. J. • Detroit • Buffalo • Cincinnati
AGENTS – Southern Engineering Company, Charlotte, N.C.; Sanderson-Newbould, Ltd., Montreal and Toronto

"The Alloy Steel Center"

WHEELOCK, LOVEJOY & COMPANY, INC.
132 Sidney Street, Cambridge 39, Mass.

STEEL SERVICE CENTER INSTITUTE

(*Concluded from Page* 115)

plate will be 435,000 tons.

The conversion will affect only the delivery end of the line. Rotary shear and stacking equipment will be removed. It'll be replaced by coiling equipment, including a delivery looper tower, gage measuring stand, tension bridle, mash welder, repeat coiler, double and snip shear, and two tension reels.

The tin mill expansion is part of Inland's $80 million capital investment program for 1960. It includes underground development of its Canadian iron mining operation, modernization of its Chicago Heights, Ill., rail rerolling mill, the tin mill expansion, enlargement of its wide flange beam capacity, construction of an ore vessel, and the addition of a continuous galvanizing line.

Foundry Changes Name

General "Malleable" Corp., Waukesha, Wis., changed its name to General Casting Corp. For the last six years, casting has been done exclusively in gray iron.

Opens Container Plant

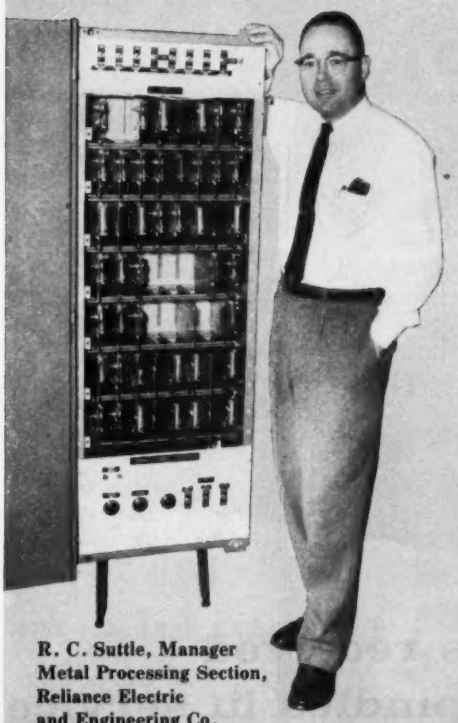
Vulcan-Associated Container Companies Inc., Birmingham, has begun operation of its 25,000 sq ft plant at Peabody, Mass. Products include steel pails and slip-cover ink cans. Gordon D. Zuck is president.

GE Modernizes Foundries

General Electric Co., Schenectady, N. Y., will spend $750,000 this year to modernize its foundry facilities in Elmira, N. Y. New gray iron melting facilities will consist of two hot blast cupolas. Modifications will be made in building structures. New pouring equipment, an electric holding furnace, and charging equipment for lifting metal and coke into the cupolas will be added.

Other steps in a multimillion dollar expansion and modernization program being conducted by GE's Foundry Dept. included: Installation of new molding facilities and progressive mechanization for medium range castings in the Elmira foundry—cost, $1 million; a $4.75 million construction program at the Schenectady foundry; opening of an

"Reliance V★S drives give American Can accurate system control for high-speed production."



R. C. Suttle, Manager
Metal Processing Section,
Reliance Electric
and Engineering Co.

"Precise system control for acceleration, deceleration and shearing is a vital contribution to this cut-to-length tin sheet line. A VSC voltage regulator controls acceleration on the unwind and leveler sections, and provides stepless speed changes. Unwind tension is accurately controlled by a VSR current regulator . . . and the entire drive is powered by Reliance D-c. motors.

"The speed of the shear is matched to the line by photoelectric loop control, maintaining loop position and assuring accuracy.

"Surface defects in the sheet are picked up visually—pin holes electronically. Mechanical gauges check uniform thickness. Rejects are dropped automatically following the shear. Automatic counting cuts handling time as the usable sheets are stacked on pallets."

These lines were developed by the F. J. Littel Machine Company, Chicago, and American Can Company and are installed in Canco Division plants.

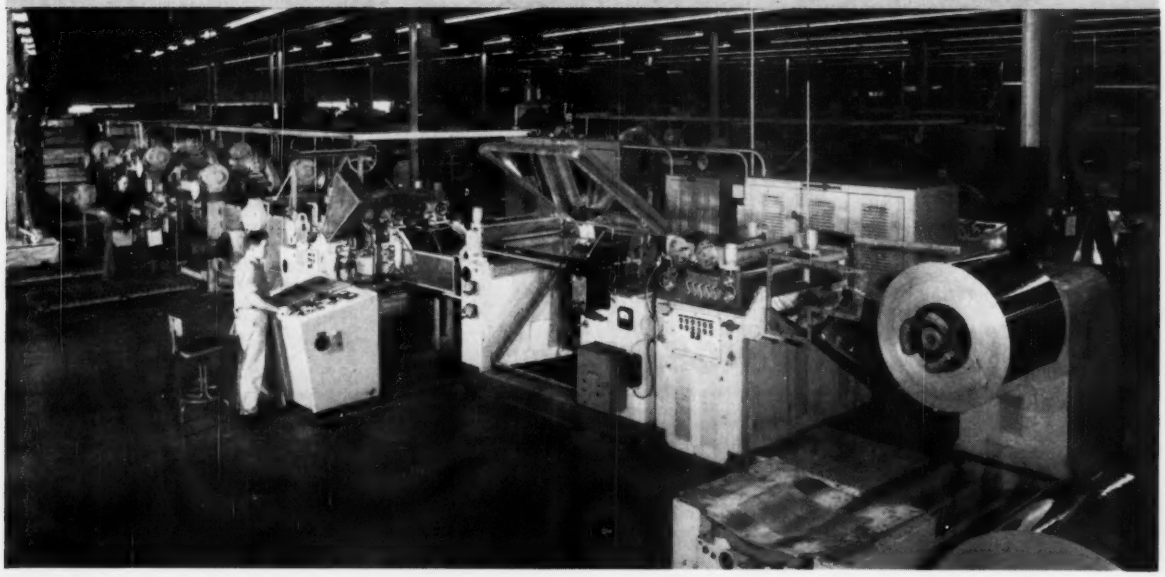
Reliance engineers are ready to help you as they have many others, with a sound understanding of system problems and solutions. Consult your Reliance sales engineer . . . or write today for Bulletin Number L-2505 for complete information. D-1640

Product of the combined resources of Reliance Electric and Engineering Company and its Master and Reeves Divisions

RELIANCE ELECTRIC AND ENGINEERING CO.

DEPT. 45A1, CLEVELAND 17, OHIO
Canadian Division: Toronto, Ontario
Sales Offices and Distributors in principal cities

Duty Master A-c. Motors, Master Gearmotors, Reeves Drives, V★S Drives, Super 'T' D-c. Motors, Generators, Controls and Engineered Drive Systems.



2 worn-out spindles received early Sunday... 2 rebuilt spindles in service Monday morning, 600 miles away!

The customer was in Greenville, South Carolina working on a time contract with stiff penalties for failing to meet the deadline. The spindles on two of their most important machine tools failed almost simultaneously and there were no spares available.

Our subsidiary, Dixie Bearings, Inc., was called late Saturday; our Spindle Repair Department in Cleveland alerted and, with the cooperation of Eastern Airlines, the spindles were in our shop early Sunday. By working all day Sunday, the spindles were back in Greenville and in operation on Monday morning!

This is only one of the many bearing services we provide. For fast help in solving any problem involving bearings—for quick delivery of any nationally known make of bearing—call the branch nearest you, day or night!

Providing bearing service in the North➤ **BEARINGS, INC.**

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Painesville • Toledo • Youngstown Zanesville • **INDIANA:** Ft. Wayne • Indianapolis • Muncie • Terre Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York **WEST VIRGINIA:** Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden • Newark **NEW YORK:** Balanrol Corp., Buffalo • Niagara Falls • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

and in the South➤ **DIXIE BEARINGS, INC.**

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans **N. CAROLINA:** Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville **VIRGINIA:** Norfolk • Richmond

Applied Research & Development Laboratory in Schenectady, an investment of $750,000; and installation of $1.6 million worth of new facilities at the Everett, Mass., foundry.

Forms Enterprise Div.

Michigan Tool Co., Detroit, has established a new division providing facilities for the production of spur, helical, and bevel gears and splines for use in prototypes and development work. The Enterprise Div. has been formed by combining a number of Michigan gear facilities with newly acquired ones of the former Enterprise Gear & Tool Corp.

Buys Sine Plate Line

Ex-Cell-O Corp., Detroit, purchased the sine plate business of the Omer E. Robbins Co., that city. The newly acquired products include a line of magnetic sine plates or chucks, as well as nonmagnetic sine plates used for inspection work. Production and sale of these sine plates are to be handled at Ex-Cell-O's Greenville, Ohio, plant. R. P. Scholl, sales manager of Bryant gage products at Greenville, will be in charge of Magna-Sine sales.

Bridge & Tank Expanding

A $2.5 million expansion program is being carried out at the Hamilton Bridge Div. of the Bridge & Tank Co. of Canada, Hamilton, Ont. The program includes installation of heavy capacity crane facilities and building expansions at the main works and an enlargement of the plant of Ford-Smith Machine Co., a subsidiary. Rheem Canada Ltd. will build a branch plant for the production of steel drums and kegs.

Lets Coke Plant Contracts

Connellsville Mfg. & Mine Supply Co., Connellsville, Pa., will design, build, and install semiautomatic material handling equipment in a new 200 unit nonrecovery coke oven installation at Calvert City, Ky. Femco Inc., Irwin, Pa., will design and install remote and automatic controls for operation of the equipment. The

(*Please turn to Page* 124)

Extra durability is a *bonus* you get along with many other proved advantages of Kinnear Rolling Doors.

Striking new proof of this was recently added to Kinnear's records of remarkably long door service: A whole battery of Kinnear Doors with 50 years of service in a busy shipping terminal *were removed from the old building for continued use in the modern structure that replaced it!*

That's why it's important to you that every Kinnear Door is *Registered.* Detailed drawings of each door are kept permanently in Kinnear's own fireproof vaults.

This is a Kinnear service that started before the turn of the century (when Kinnear *originated* the door with the interlocking-slat curtain).

You can be sure that, *at any time in the future,* correct replacement for any worn or damaged parts of any Kinnear Rolling Door will be available promptly.

In addition, Kinnear Rolling Doors save space . . . coil completely out of the way . . . clear the entire opening . . . remain out of reach of damage while opened . . . complement any building architecture . . . and assure all-metal protection against wind, weather, trespass or vandalism. Built to fit any opening, in new or old buildings. Power operated if desired. *Write for full details!*

The KINNEAR Manufacturing Company

FACTORIES: 1780-1800 Fields Ave., Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, Calif.

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Saving Ways in Doorways

KINNEAR ROLLING DOORS

NOW YOU CAN GET SAFER, FASTER, LONGER-LASTING

Anaconda Durasheath has a new clean-stripping, semi-conducting tape

The megohm meters (above) are measuring the surface resistivity on two samples of high-voltage, rubber-insulated, Shielded and Neoprene-jacketed cable immediately after the semi-conducting tape has been removed. The sample on the left (with a megohm meter reading in excess of 100 megohms) is Anaconda Durasheath incorporating the exclusive clean-stripping, semi-conducting tape. For comparison, the cable on the right with a low reading typifies old-style cable manufactured with ordinary semi-conducting tape.

The old-style cable requires tedious surface filing and buffing before it is clean of conducting particles, and ready for the tape build-up necessary to complete the splice or termination. Even after all these preparations, the surface may still be conducting because of the semi-conducting particles remaining deeply imbedded in the insulation.

New Anaconda Durasheath eliminates the need for excessive filing and buffing. Because the semi-con tape strips clean, the bared Durasheath insulation surface is left with only slight traces of easily

"Meggers"—courtesy James G. Biddle Co., Philadelphia, Pa.

JOINTS AND TERMINATIONS ON HIGH-VOLTAGE CABLE

removed semi-conducting particles. The meter readings will show that a moment of buffing is all that's needed to complete surface preparation for tape build-ups and the most reliable splice or termination possible today.

The planned research and production program which brings you this outstanding cable development is also responsible for the equally important developments in Butyl rubber insulation compounding, and extruding, which have produced the best possible balanced design and construction in high-voltage rubber-insulated cable obtainable today—Anaconda Durasheath.

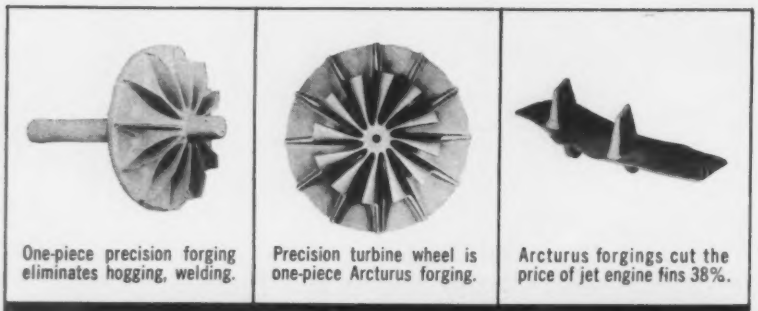
For more details, write for Anaconda Bulletin DM-5903, covering Durasheath High-Voltage Cable and DMS-5566, 5720 & 5735 dealing with the splicing & terminating of Durasheath Cable. Contact your nearest Anaconda Wire & Cable Company District Office, or write to: 25 Broadway, New York 4, N. Y.

60238 Rev.

ASK THE MAN FROM

ANACONDA®

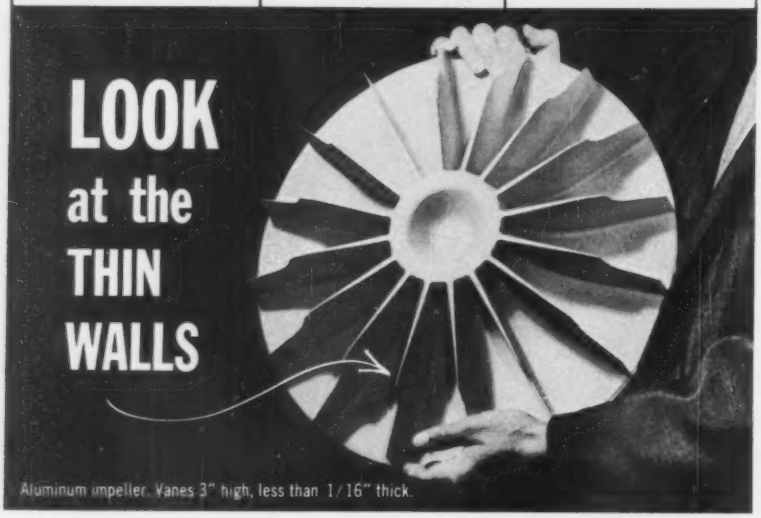
ABOUT DURASHEATH® CABLE



One-piece precision forging eliminates hogging, welding.

Precision turbine wheel is one-piece Arcturus forging.

Arcturus forgings cut the price of jet engine fins 38%.



Aluminum impeller. Vanes 3" high, less than 1/16" thick.

CAN THESE BE FORGINGS?

Arcturus is Creating Forgings Said to be Impossible

HERE'S ONE RESULT →

PRECISION THIN WALLS AND DEEP DRAWS

Can these be forgings? They can – and are. Arcturus is creating forgings said to be impossible. How? Using remarkable new Arcturus forging techniques. The Result? Engineers are taking a long new look at the value and use of forgings. Strength? These new forgings are stronger because grain flow follows contours. Machining? It's reduced drastically – sometimes eliminated altogether. Materials? Most metals and high temperature alloys – 6150 steel; 19-9DL; A-286; M-308; Inco 901; René 41; 50% molybdenum – 50% tungsten; and others. How to get information? Send us your drawings and specifications.

FORGE AHEAD WITH

Arcturus

MANUFACTURING CORPORATION

4311 Lincoln Blvd., Venice, Calif. • Phone: UPton 0-2751

(*Concluded from Page* 121)

Calvert City plant is being constructed for the New York Mining & Mfg. Co., New York.

Connellsville Mfg. will build a coke pusher, leveler, larries, conveyor, quencher, and mud trucks. With this equipment, the plant can produce 1000 tons of coke a day at a conversion cost of about 60 cents a ton, says R. L. Lepley, vice president and general manager.

NEW PLANTS

U. S. Steel Supply Div., U. S. Steel Corp., is building a steel service center at 21st Street and Avenue C, Ensley, Ala. The structure will replace two older buildings in the Birmingham district.

Illinois Tool Works, Chicago, is constructing its second Des Plaines, Ill., plant. The 73,000 sq ft facility will house the firm's Conex Div.

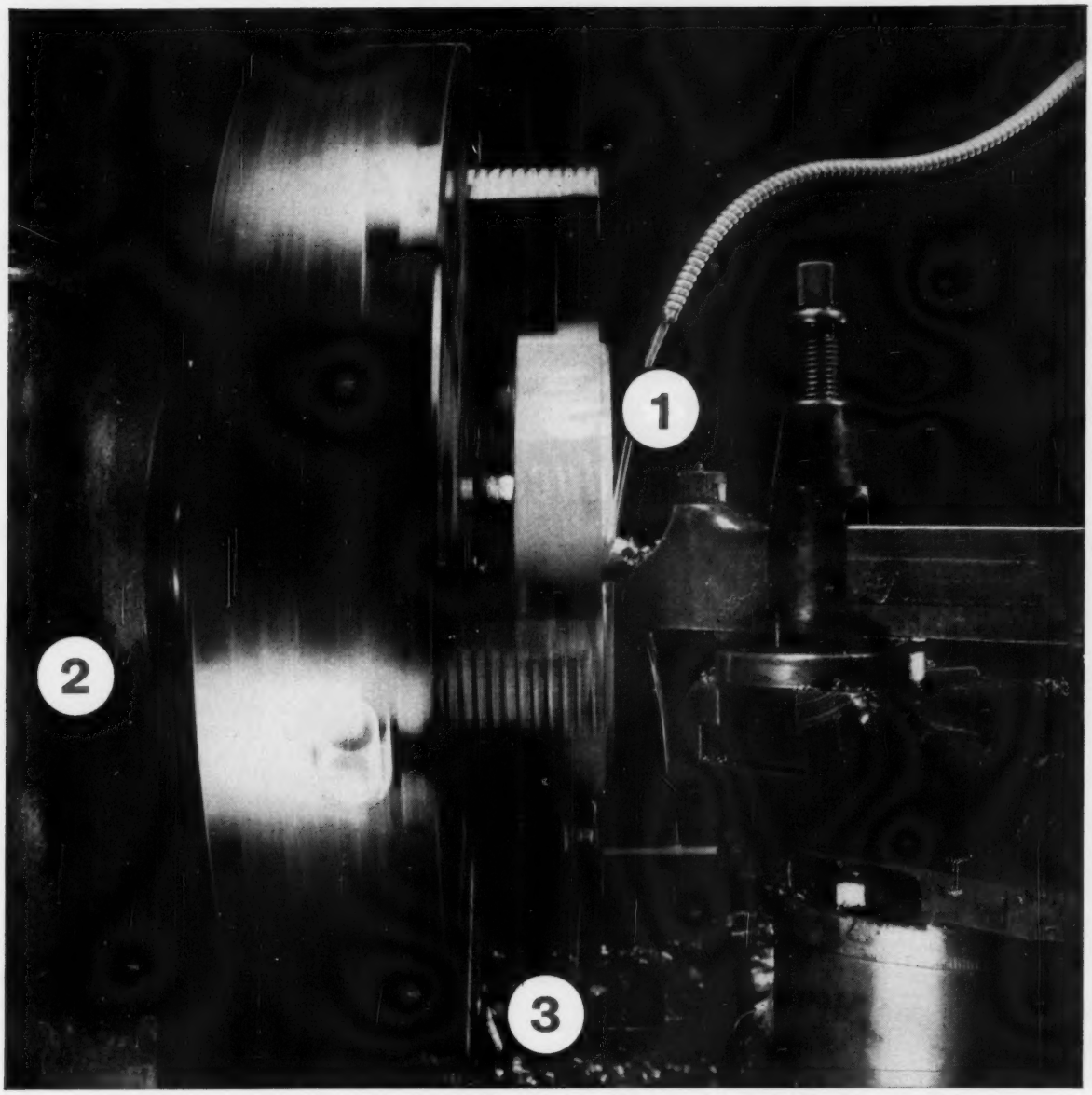
CONSOLIDATIONS

Merger of **Ling-Altec Electronics Inc.,** Anaheim, Calif., and **Temco Aircraft Corp.,** Dallas, is being considered by directors.

Emerson Electric Mfg. Co., St. Louis, will merge with **Day-Brite Lighting Inc.,** that city, subject to approval of Day-Brite stockholders. Emerson produces electric motors, cooling and heating appliances, and electronic and avionic devices. Day-Brite manufactures lighting fixtures.

ASSOCIATIONS

American Society of Lubrication Engineers, Chicago, elected these officers: President, L. O. Witzenburg, Cleveland Worm & Gear Div., Eaton Mfg. Co., Cleveland; vice president at large, D. M. Cleaveland, Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.; treasurer, W. E. Hoch, Viscosity Oil Co., Chicago; and secretary, A. E. Cichelli, Bethlehem Steel Co., Bethlehem, Pa. Regional vice presidents are: Eastern, M. M. Gurgo, Esso



CUT THROUGH PRODUCTION LAGS WITH ESSO LUBES

1. Fanox® high-wetting, non-staining oils for use in cutting non-ferrous metals and for quenching and drawing all metals. The low viscosity of Fanox 32 helps boost the heat dissipation rate to speed the work . . . as in the aluminum machining above.

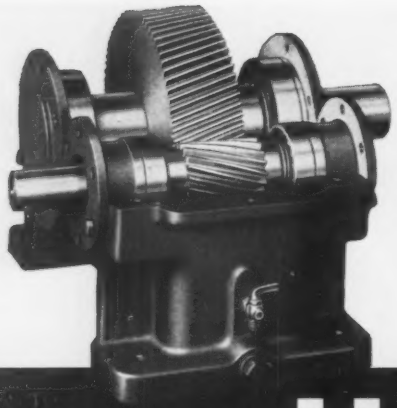
2. Nuto® oils protect highly finished gear surfaces from excessive wear and rust. Resist foaming to assure ample lubrication. Oxidation inhibited to prevent sludging . . . provides month-after-month service.

3. Febis® K lubricants insure smooth-sliding ways ...boost precision by eliminating "stick-slip" movement. These lubes actually make static friction less than sliding friction; easily pass the stick-slip test.

There's a complete line of specialized Esso Lubricants to help you cut through production lags. Contact your local Esso office or write: Esso Standard, Division of Humble Oil & Refining Company, 15 West 51st Street, New York 19, N. Y.

Esso

In Industry after Industry..."ESSO RESEARCH works wonders with oil"



Fast Delivery on Custom Requirements

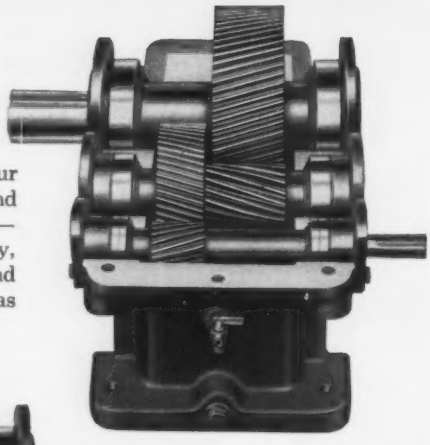
Specify **H & S**

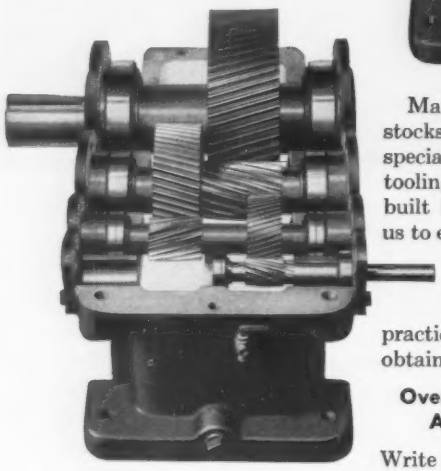
Helical Speed Reducers

Single · Double · Triple Reduction

You get *fast action* when you come to Horsburgh & Scott with your speed reducer and gearing problems.

We are able to meet your specifications—or design and build to your specific needs—products of highest quality, backed by the experience and reputation of many years as leaders in the gearing field.





Maintaining one of the largest stocks of patterns and blanks . . . special equipment and special tooling—much of it designed and built in our own plant—enables us to engineer and produce a wide range of custom gearing and transmission requirements, economically and practically as fast as you can obtain them from stock sources.

Overall design conforms to AGMA specifications

Write for details on wide size and capacity range of H&S Speed Reducers—Helical, Herringbone, Worm Gear and combinations.

The HORSBURGH & SCOTT CO.

5112 Hamilton Avenue • Cleveland 14, Ohio

Specializing in fast production of quality Speed Reducers and Gearing to meet custom requirements.

Standard Oil Co., division of Humble Oil & Refining Co., Pittsburgh; central, R. L. Leslie, Vickers Inc., Detroit; midwestern, J. N. Waddell, Henry H. Cross Co., Chicago; western, D. P. Thomas, Columbia-Geneva Steel Div., U. S. Steel Corp., Provo, Utah; Canadian, John Boase, Lincoln Engineering Co., Toronto, Ont.

NEW OFFICES

Mincom Div., Minnesota Mining & Mfg. Co., West Los Angeles, Calif., will open a sales office in July at 425 13th St. N.W., Washington 4, D. C.

Thermo Electric Co. Inc., Saddle Brook, N. J., opened a factory office at 19458 Ventura Blvd., Tarzana, Calif. The firm makes temperature measuring systems, thermocouples, and accessories.

Harbison-Walker Refractories Co., Pittsburgh, opened a district sales office in Los Angeles, under the managership of C. F. Wenrich.

NEW ADDRESSES

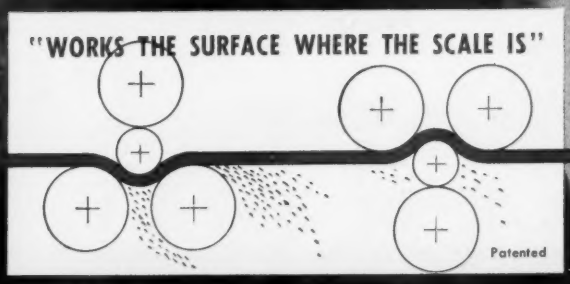
Fostoria Corp., Huntingdon Valley, Pa., relocated its Madison, N. J., sales office to 120 Morris Ave., Springfield, N. J. The office will represent Fostoria's Chempump, Dynapump, Infrared, and General Products divisions. The Chempump and Dynapump office (formerly in Schenectady) has been relocated at 111 Devonshire Court, Rochester 11, N. Y.

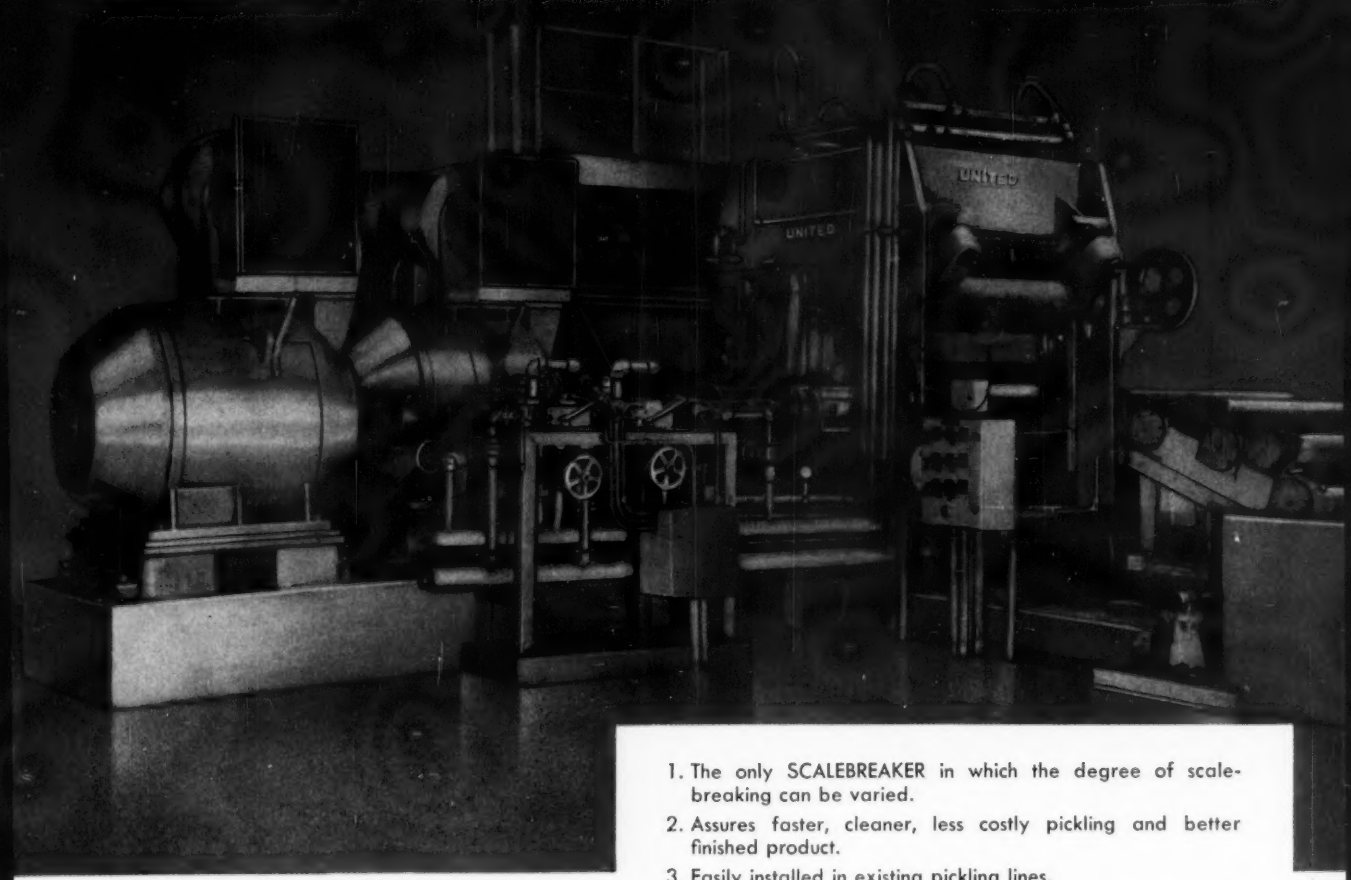
Williamsville Buff Co. Inc. has started operation on the premises of Divine Bros. Co. at 200 Seward Ave., Utica, N. Y. Williamsville buffs were formerly made by the Williamsville Buff Div., Bullard Clark Co., Danielson, Conn.

Fuller Co., Catasauqua, Pa., moved its Kansas City district office to 7501 Mission Rd., Kansas City 15, Mo. David W. Armstrong is district manager. Fuller makes pneumatic material handling systems and their components.

UNITED®

NEW *Strip Processing* SCALEBREAKER





1. The only SCALEBREAKER in which the degree of scale-breaking can be varied.
2. Assures faster, cleaner, less costly pickling and better finished product.
3. Easily installed in existing pickling lines.

Write today for complete engineering data.

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Plants at: Pittsburgh • Vandergrift • Youngstown • Canton • Wilmington

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Stedman Foundry and Machine Company, Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.

WONDERING HOW TO CUT PAINT MAINTENANCE COSTS?

If you want to cut maintenance costs, Herb Norton's a good man to talk to. A member of Du Pont's recently formed Technical Service Group, Herb's a specialist whose job it is to solve maintenance painting problems of every description. In his words:

"The further maintenance dollars go, the greater the return on your investment in plant and equipment. True costs, however, aren't determined solely by the price of the paint. To measure value accurately, you've got to take into account such factors as expense of application and length of time the paint job lasts. Believe me, it's false economy to start with anything but top-quality finishes. That's one reason Du Pont paints are so often specified.

"Another reason, equally important, is the expert guidance you get from Du Pont. You see, we go right into your plant or installation and make a thorough study of your individual maintenance problem. Then—drawing on our own experience, backed up by Du Pont technical competence—we formulate a painting program that meets your needs exactly. Service like this helps you achieve lasting protection against every conceivable corrosive condition, *at lowest cost per square foot per year.*"

If you have a maintenance problem you'd like to discuss with an expert, there's a man like Herb Norton in *your* area. To meet him, just call your nearest Du Pont district sales office. Or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. S-65, Wilmington 98, Delaware.

* * *

Herbert L. Norton came to Du Pont's Finishes Division in 1939, having studied chemical engineering at the Georgia School of Technology. As he added experience, increased responsibilities kept pace. Currently, Herb is Southeastern District Manager, Industrial Maintenance Sales. His background includes problem-solving in such areas of industry as textile, paper, petroleum, food, marine and public utilities.

DU PONT PAINTS

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Technical Outlook

L-D PROGRESS NOTE— Kaiser Engineers Div., Henry J. Kaiser Co., Oakland, Calif., is designing an L-D oxygen steel installation that will feature three furnaces, each with a 250 ton capacity per heat. Annual output will be close to 4 million tons, large by today's standards for any type of steel production. (That's based on continuous production of two vessels plus a standby.) Technological leapfrog from today's vessel size is equivalent to that needed to build a 1900 ton open hearth compared with present knowhow, Kaiser says. Main problem: Material handling.

DUCTILE MAGNETS—A copper-nickel-iron alloy recently developed permits stamping, machining, or forming magnets into a variety of shapes said to be difficult or impossible for more conventional materials. The material has high coercive force and energy product values, says Hoskins Mfg. Co., Detroit.

ROAD TO HIGH TEMPERATURE—It will be paved with ceramics, predicts Dr. John R. Townsend, special assistant to the director of defense research and engineering, Department of Defense. (We are running out of ductile materials that can withstand extremely high temperatures. We know we can make ductile ceramics. We have new design concepts which permit the use of more brittle materials.) He also sees great hope for composite materials of ceramics, graphite, and metallic or organic substances.

BEARINGS NOTE— A West Coast source reveals it has stumbled on to a dry film lubricant which the Navy feels works well at 650° F. The Navy should have some data shortly for distribution to interested firms.

HOT COATINGS— Lavelle Aircraft Corp., Newtown, Pa., fabricator of the drum that houses all active components of the Tiros weather satellite, says it applied coatings to the drum's structural surfaces to obtain a proper temperature distribution in the satellite. External surface finishes determine the thermal energy interchange between the satellite and the "radiation surround" (the sun and earth as thermal sources). Interior surface finishes determine the degree of thermal communication among payload components and the structural shell. In addition to temperature control, the hard coating (applied with an anodic process) offers a superior gluing surface for the solar cell mounting boards and improved electrical insulation, says Lavelle.

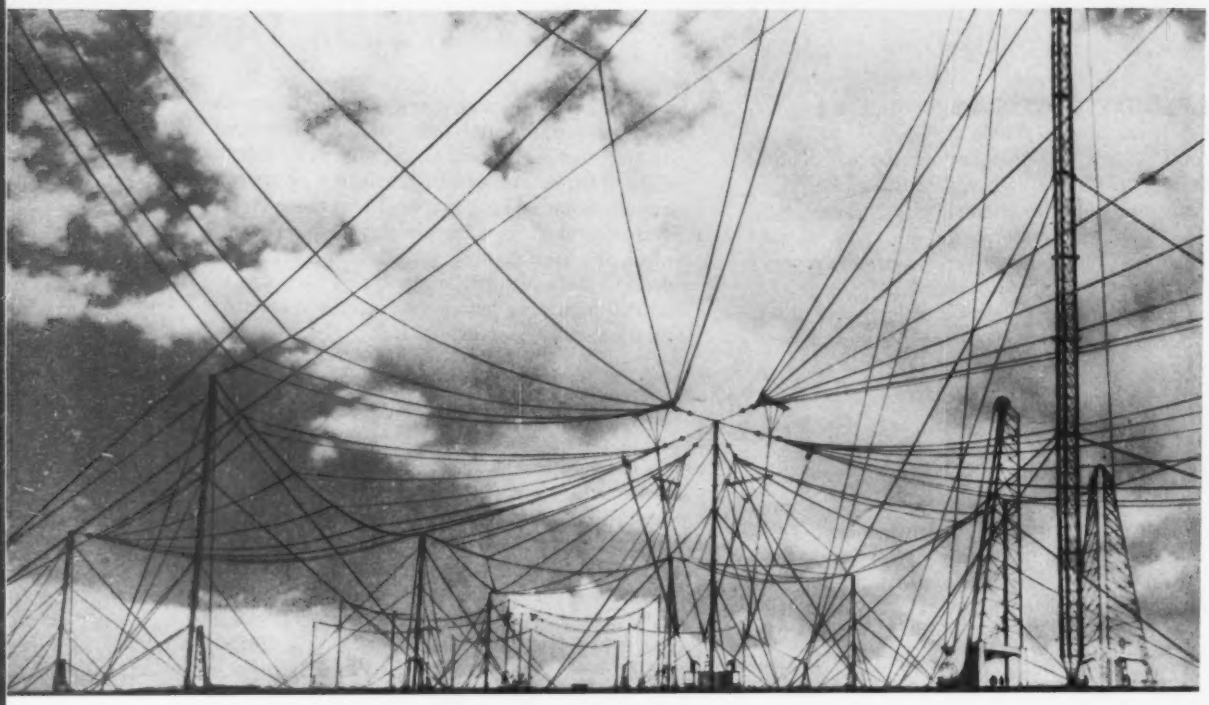
GIANT SPACE PIECE— A West Coast firm reports it is designing a tool to form an airborne, high temperature structure at the launching site. The structure, which will operate in corrosive atmosphere, is two stories in diameter at the small end and eight stories at the large end. (It is in the general shape of a tapered cone.) Materials are not specified. The tool, said to be an advanced plasma jet, will deposit the material in cup-sized strips, layer on layer, as the surface rotates as in a lathe. Significance: It is a practical tool for constructing large, self-supporting shapes from hard-to-handle materials.

VALVE COSTS TRIMMED— A method of projection welding Stellite seats in high temperature-pressure valves has slashed fabricating costs, says Edwards Valves Inc., East Chicago, Ind., a subsidiary of Rockwell Mfg. Co. The technique produces sounder inserts, cuts machining, and is faster than the former manual welding method.

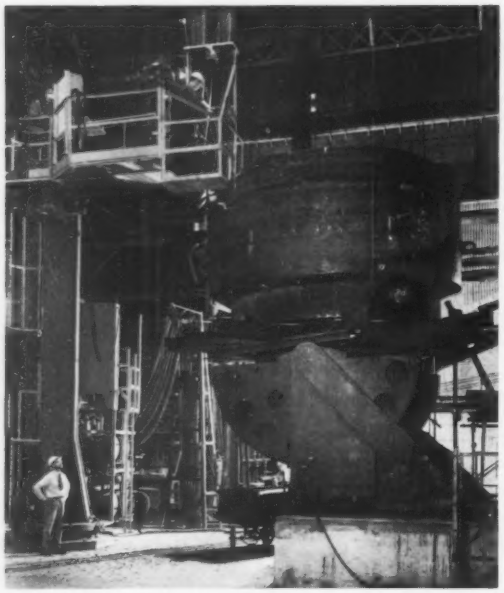
BETTER ABRASIVE—An improved aluminum oxide permits up to twice as much metal removal per wheel as previous grades, claims Norton Co., Worcester, Mass. Early lab and field tests suggest that the cost of metal removal could be cut perhaps 40 per cent.

RUSSIAN CASTING TIPS—How precision casting is done by the Soviets is contained in a technical translation which you can get from Office of Technical Services, Business & Defense Services Administration, Department of Commerce, Washington 25, D. C. (Ask for 59-11937.)

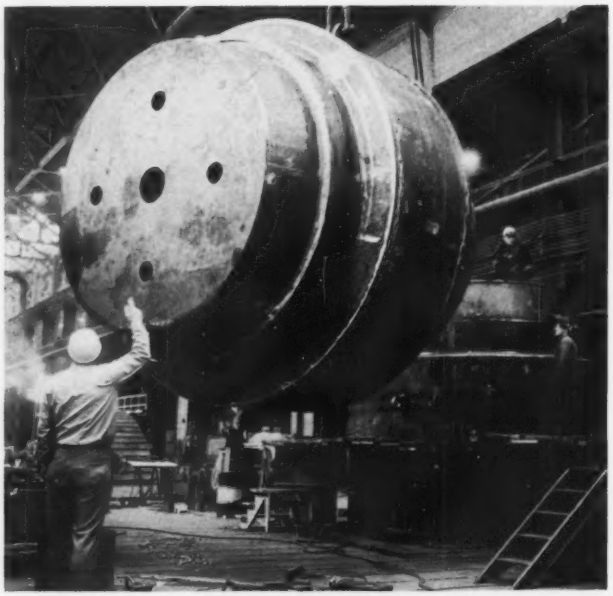
Huge Steel Counterweights Guard Spidery Network



Giant antenna web of $67 million Navy communications center will permit transmission to the North Atlantic and Arctic Oceans



Weldment shop uses 350,000 lb capacity positioner to permit downhand welding of the huge shells



Pipe through the four small holes welded into position, will contain lead shot used for final balancing; large hole is for axle

Plates form outer shell of 200-ton devices used to compensate for high winds and thermal changes at Navy communications center under construction in Maine

HUGE counterweights weighing 200 tons each hold a vast antenna network taut and permit efficient operation despite heavy winds and temperature changes. The system is under construction at a new Navy communications center in Cutler, Maine.

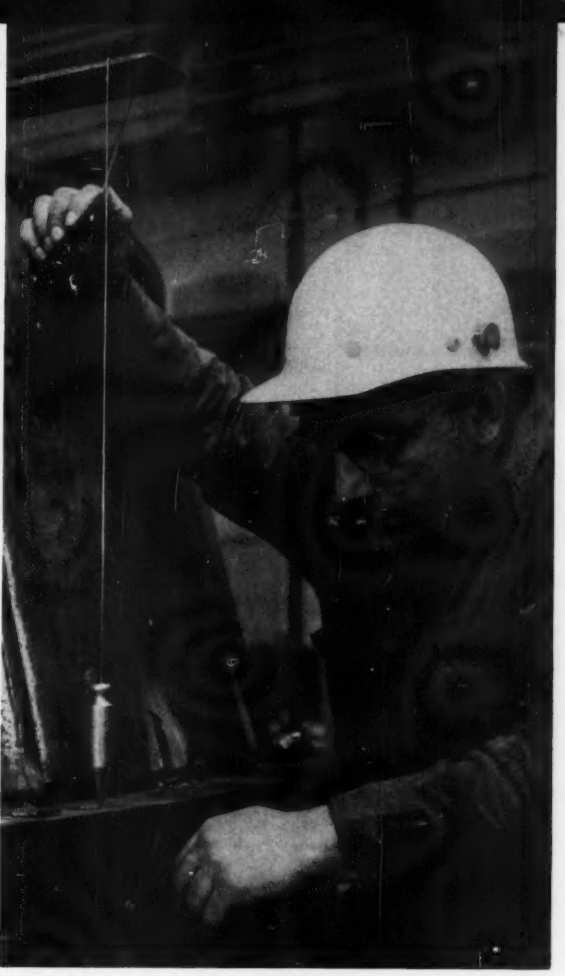
The 36 counterweights roll on curved tracks, so that the farther they are displaced, the more pull they exert on the antenna cables. Tracks and the yokes which connect the weights to the cables are being fabricated by Bethlehem Steel Co. at Steelton and Bethlehem, Pa.

The steel used in each counterweight weighs 30 tons. After the barrel-shaped welded containers are formed, they are filled with concrete. Balance and final weight adjustment are obtained by pouring lead shot into 6 in. pipe sections welded into the end plates. The ends are 12 ft in diameter; outside diameter is 13½ ft.

End plates are flame cut from 1 in. plates. Some of the cylinder sections require plates as heavy as 4 in. They are formed in half sections on a 6000 ton press, then buttwelded.

Automatic, submerged arcwelding equipment is used. To permit downhand welding, a power turning roll or a 350,000 lb capacity positioner is used to move the shell.

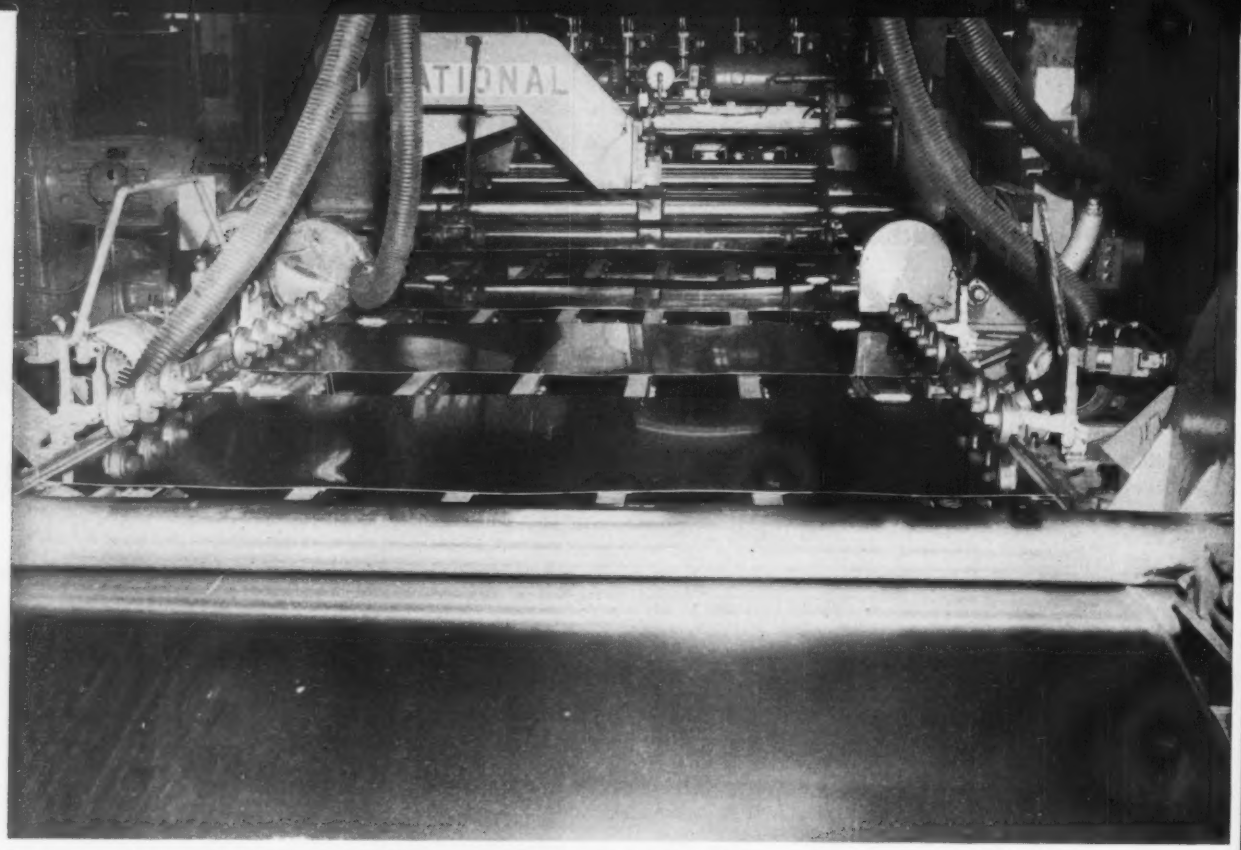
As final steps before shipping, all welds are ground flush, and the shell is given three coats of paint—two of zinc chromate primer and a final of International orange.



Continuing checks for dimensional accuracy are needed to assure that heavy "barrels" will roll smoothly on their tracks

Steel yokes will straddle counterweights and connect them to cable system for antenna. Well type car handles three

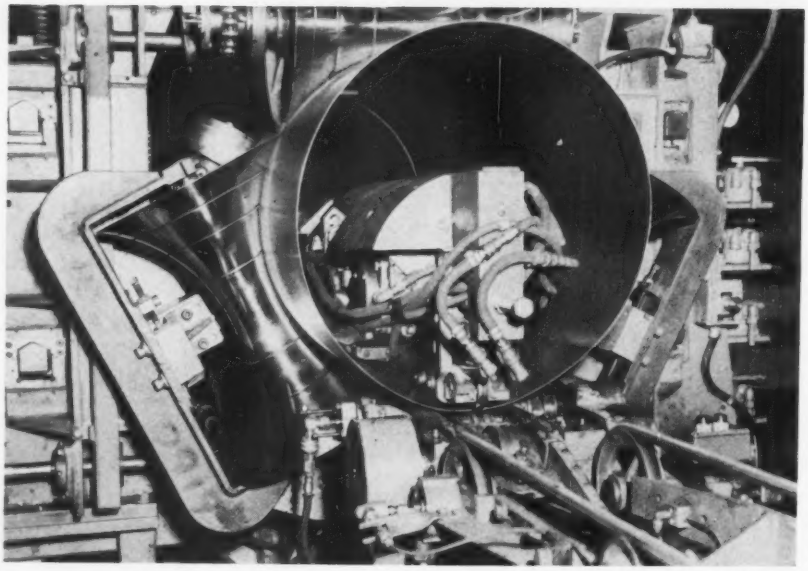
Shells are shipped two to a car. On reaching Bath, Maine, shell, yoke, and shaft are assembled as unit, then barged to Navy construction site



Sheets move from slitter (at top) past edge cleaning abrasive wheels (center) to transfer station in foreground which pushes them to the left into forming rolls

Inland Makes Drum Shells Automatically

New forming and welding line can turn out up to 1000 container shells an hour. Quick size changeover and an abrasive method of cleaning edges for welding are plus features



Contoured rolls guide drum through welder. Swaging unit, inside drum, rolls the weld seam smooth

HIGH production, low cost, and product quality are some of the plusses Inland Steel Container Co., Chicago, is realizing on its new drum shell manufacturing line.

The line features automatic sheet handling, trimming, edge cleaning, forming, and welding. It can turn out 30 to 65 gallon drum shells at a rate of 600 an hour. Up to 1000 smaller shells can be produced in the same time.

• Quick size changeover and improved edge cleaning are other plusses.

The equipment can be set up to handle any of three drum diameters.

Abrasive wheels clean the side seam before welding. The technique has improved welding efficiency and reduced edge cleaning costs considerably, say Inland engineers. An automatic adjustment compensates for wheel wear.

• Steel sheets 44 to 72 in. long and 15 to 42 in. wide can be fed into the line.

High-lift vacuum feeders pick up the sheets and deposit them on magnetic rolls which carry them into a slitter. When the stack has been used up, a power dolly moves a new stack into position under the vacuum device.

Sheets are squared and slit to size within 0.005 in. Edges are cleaned and prepared for welding. The sheets then go through forming rolls and into the welding machine.

The resistance seamwelder was built by National Electric Welding Machine Co., Bay City, Mich. It can handle hot or cold sheets, 14 to 28 gage.

• After welding, the seam is mashed to leave a smooth interior for uniform lining.

A floor-mounted "masher" is attached to the front of the welder. The drum shell passes between an upper idler roller and a lower air pressurized driven contour roll which blends the inside contour of the seam.

The lower roll is split and has a threaded adjustment to accommodate various metal thicknesses.

After leaving the swaging rolls, the shells are upended onto a live roll conveyor and are transferred to the balance of the drum fabricating equipment.

Template Costs Pared 80%

Paper patterns (above) replace wood (below) making setup simpler, storage easier

Electronic scanning device follows full scale penciled outline of part, eliminating wooden patterns. Costs plummet from $800 to $160 a month

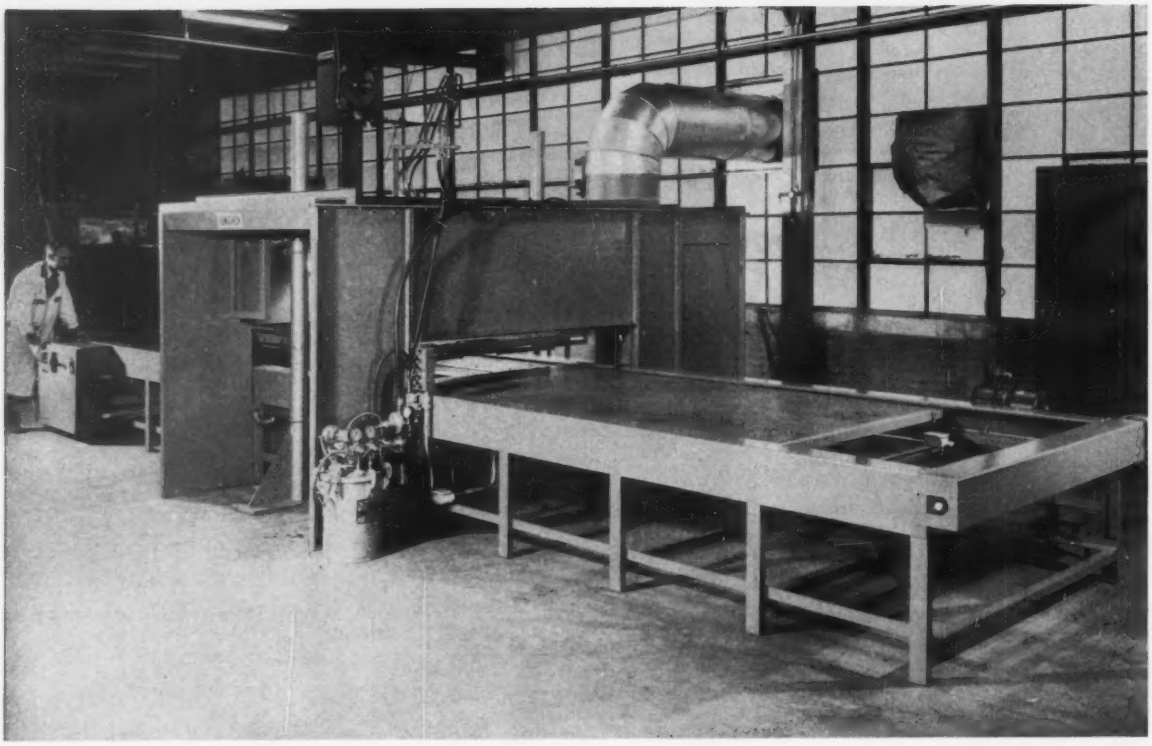
FLAME CUTTING costs have shrunk by $10,000 a year since an electronically controlled, four torch, shape cutter replaced four single cutters at the Parkersburg Rig & Reel Co. plant, Coffeyville, Kans. More than three-fourths of the saving can be attributed to reduced template costs.

The machine was made by National Cylinder Gas Div., Chemetron Corp., Chicago. Only one man is needed to operate it. After manually directing the tracing head to an approach line on the drawing that leads into the part outline, he switches to automatic control. An electronic tracer controls torch motion, following a full scale penciled outline of the part.

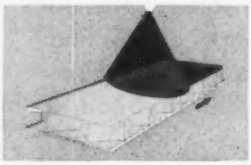
Each torch is said to cut about 15 per cent faster than the former equipment. The optical scanning system follows any drawn line 0.040 in. wide or less, within 0.005 in. (plus or minus) at speeds up to 25 in. a minute.

Making the paper patterns costs $160 a month (and this expense will be cropped another 25 per cent when the old templates are converted into drawings) compared with $800 for the displaced plywood base templates with aluminum strip edge. One draftsman spends less than half this time drawing about 25 paper patterns a month, reports Parkersburg.

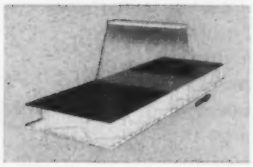
Filing the patterns is simply a matter of storing in a drawer underneath the machine. They take little space and are immediately available to the operator. Before, the large wooden templates had to be stored outside the production area. Retrieving them would sometimes take an hour and a half.



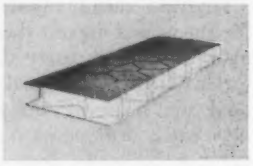
The moving table is in the unload position at right. When loaded, the table moves left to right under a spray station and then a heating station. Drawing at right shows how the process works



SPRAY . . .



HEAT . . .



INSPECT

Test May Broaden Honeycomb Use

Unit can test panels as large as 5 by 10 ft at a rate of 1600 sq ft an hour. Thermographic fluid indicates bond pattern of completed panels. Process is simple. Controls are critical factor

THERMOGRAPHIC inspection can slash up to 80 per cent off the present cost of processing brazed honeycomb panels and help pave the way for wider use of the material, says Magnaflux Corp., Chicago, a subsidiary of General Mills Inc.

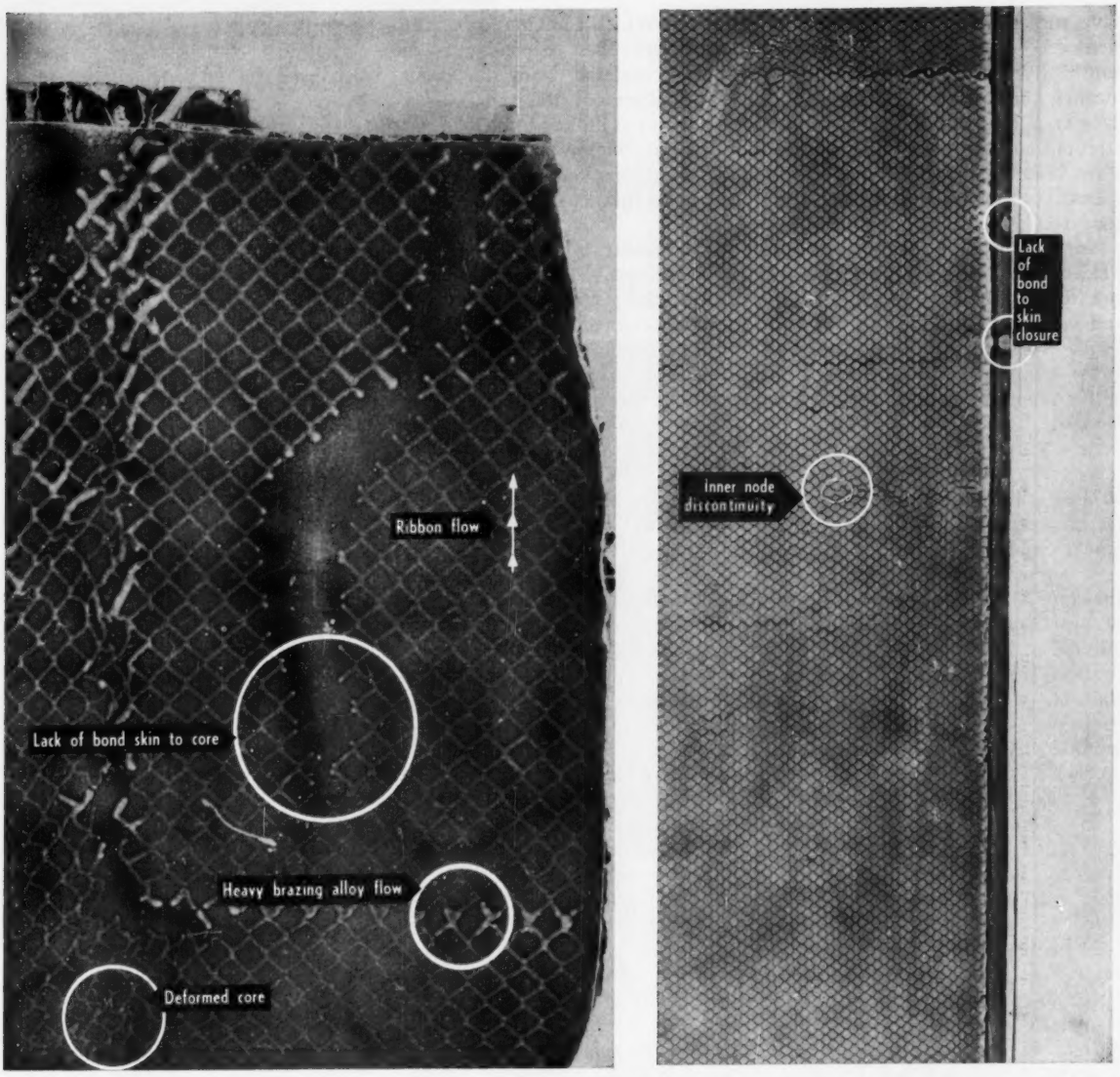
The testing of completed panels has been a major drawback in application development. Costs are high (sometimes equal to the cost of fabrication) and processing rates are slow.

• Test fluids utilized in the thermographic method (called Bondcheck) give an "inside view" of the bonded area.

The fluids are repelled from warm areas and coalesce in cool areas. The effect is caused by temperature differential). The greater the differential, the more distinct the pattern will be.

When a liquid is applied to a brazed honeycomb sandwich and the panel is heated on one face, the foil partitions between the skins act as heat sinks and stay relatively cool. They attract the thermographic liquid to them to mark and reveal the bond pattern. If there is lack of bond between the skin and the core, the skin in that area will heat up and no pattern indication will appear.

By viewing the pattern on the surface of the skin, the lack of bond areas is apparent, as is deformed core material. When heat is re-



These two photos show the kind of defect the process is capable of detecting. The inspection coating can be removed with a solvent

moved, the fluid sets in a permanent pattern which may be kept as long as necessary, can be readily photographed for records, or can be easily removed with a solvent.

• The BC-60 Bondcheck unit can test panels up to 5 by 10 ft at about 1600 sq ft an hour.

It is built around a moving, expanded metal table which carries the panels under spraying heads to apply the fluid and then under a bank of infrared lamps. The pattern develops under the lamps and cools and dries rapidly as it leaves them.

The table is driven through a gear reducer that allows an adjustable speed through the spraying and heating stations. Two spray guns reciprocate across the panel as it passes under them. They can be adjusted to control the thickness of the film. Heat intensity is controlled by: 1. Regulating temperature at control station. 2. Adjusting height of lamps in relation to the surface of panel being processed.

• The company has just shipped its first production size thermographic inspection unit to its Los Angeles plant. Major aircraft companies on the West Coast are waiting to give the technique a thorough tryout.

Magnaflux has been doing evaluation programs for several aircraft companies with an experimental unit in its California plant for about a year. James Borucki, research chemist, reports that it has accurately revealed these conditions in brazed honeycomb structures:

- Lack of bond—skin to core.
- Lack of bond—skin to doubler.
- Lack of bond—skin to closure.
- Direction of ribbon flow.
- Inner node discontinuity.
- Deformed core.
- Heavy brazing alloy flow.

To date, all high strength alloys, core, and braze combinations tested

have successfully responded to the method. Facing sheet metal has ranged from stainless to titanium, Inconel, and Zircaloy. Structures have been brazed with silver, silver-lithium, copper, nickel-boron, and other braze metal combinations.

Besides honeycomb structures, good results have been obtained in testing certain spotwelded and seam-welded (space metal) structures—gas turbine blades, stator blades, and vanes.

• Bondcheck patterns correlate well with other nondestructive testing methods.

In some cases, aircraft companies report that the thermographic method has found conditions in brazed panels that were not revealed by other nondestructive tests.

In one case, Mr. Borucki reports, Bondcheck indicated a good bond in an area where other methods had pointed to lack of bond. A pull test revealed the bond was good, but the core was crushed which made it appear as a lack of bond by other methods. Bondcheck will show up deformed cores, but not crushed ones, says the research chemist.

In another instance, Bondcheck revealed a lack of bond in a panel where it had seemed good. A pull test showed that there was a lack of bond between skin and core. The core material broke away from the braze fillet which was more strongly bonded to the skin.

• While the process itself is simple, many of the controls are critical.

One control is the formulation of the test fluid. Magnaflux has four formulations, called BC-1, BC-2, BC-3, and BC-4. The first one developed, BC-1, does not produce a permanent pattern. It disappears as the panel cools. BC-2 is most useful for inspecting structures other than honeycombs — gas turbine blades, stator blades, vanes.

BC-3 and BC-4 have the widest use potential and are easy to photograph for permanent records. BC-3 produces a negative indication (light lines on a dark background) and BC-4 a positive indication (dark lines on a light background).

Evenness and thickness of the spray are critical. Magnaflux finds a thickness of 0.0002 to 0.0003 in. usually gives the best results. Degree of heat is another important control. Which combination of controls works best depends on the kind of material being tested and the thickness of the skin. So far, Bondcheck is limited to facing sheets 0.032 in. thick with current thin foil partitions, and gives its best results on thinner skins.

• Precleaning is an important step in the process.

Burnishing might be necessary for severely colored surfaces and solvent or vapor phase degreasing is needed for surfaces contaminated with agents which would interfere with the wetting ability of the Bondcheck fluid.

Since results of the method depend on the temperature differential, panels must be at room temperature or lower before processing.

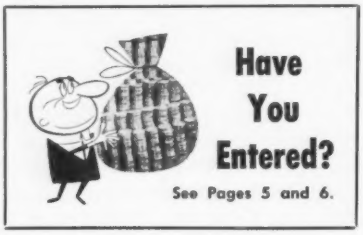
• The BC-60 unit is a production model.

It can be integrated into almost any production flow line. The same process can also be used for line maintenance and overhaul inspection of supersonic aircraft with airframe or component honeycomb construction in military and commercial service, as well as certain jet engine parts.

It does not require highly trained technicians to operate it, once controls are established. Irregularities are more easily interpreted than other nondestructive test methods because the pattern appears directly on the panel.

Processing equipment can be adapted to handle curved, wedged, or extra thick sections, as well as standard flat panels. It allows the salvage of larger panels which have imperfect bonds. Small panels of good material can easily be cut out. With the pattern clearly printed on the skin, it is easy to avoid bad spots and get maximum utility from the sandwich.

Magnaflux has two more units of its production size model planned. They will be used for commercial inspection.



Stainless Battery Case Leads to Major Savings

Sintered plate, nickel-cadmium batteries used by Capital Airlines are encased in stainless steel. The airline reports the use of stainless has significantly contributed to the $40,000 to $50,000 saved annually through lower maintenance and replacement costs.

Capital expects to get three to four years' service from the batteries, made by Sonotone Corp., Elmsford, N. Y.

Dominating the reasons for selecting stainless (Type 302) is its resistance to the corrosive action of potassium hydroxide electrolyte. Painting of the battery exterior is unnecessary.

Exploiting the metal's favorable strength to weight ratio permits the use of thin gage sheets for the cases. Reduction of battery weight and dimensions results in packaging more electric power in a smaller volume.

Exposure to temperature extremes when flying affects most materials suitable for battery casing. Stainless Type 302, however, gains in tensile strength at lower temperatures with negligible loss in toughness. At elevated temperatures, the stainless case retains its toughness.

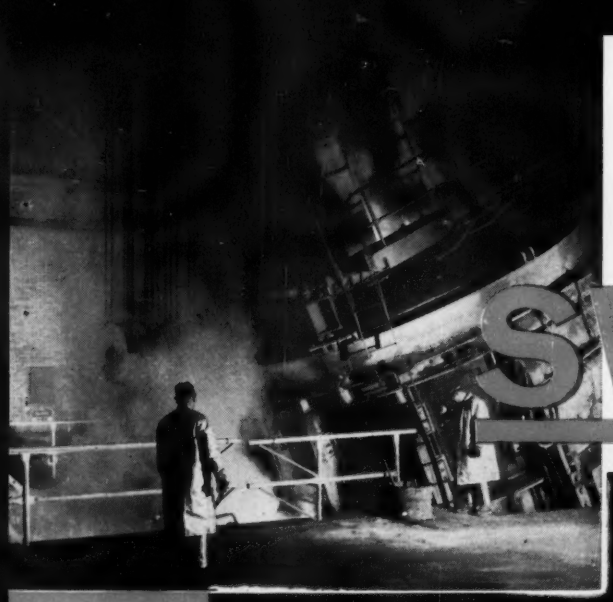
Automatic Unit Hardens Trunnion Bearings Quickly

An automatic, eight station fixture maintains tolerance within 0.0015 in. while the inside of the bore and bottom of the inside of trunnion bearings are hardened at the rate of one every 6.8 seconds.

Induction Heating Corp., Brooklyn, N. Y., designed and built the machine (it's known as a Ther-Monic unit) for the Automotive Div., Saco-Lowell Shops.

A rotating work station has eight spindles that also rotate during the heat and quench cycle. After parts have been loaded onto the spindles by an operator and rotation of that station has been started, each spindle in turn is precision fixed beneath an air operated coil, which is lowered into the fixture.

On completion of the heat and quench cycle, the bearing is ejected onto a chute that carries it to a tote box.



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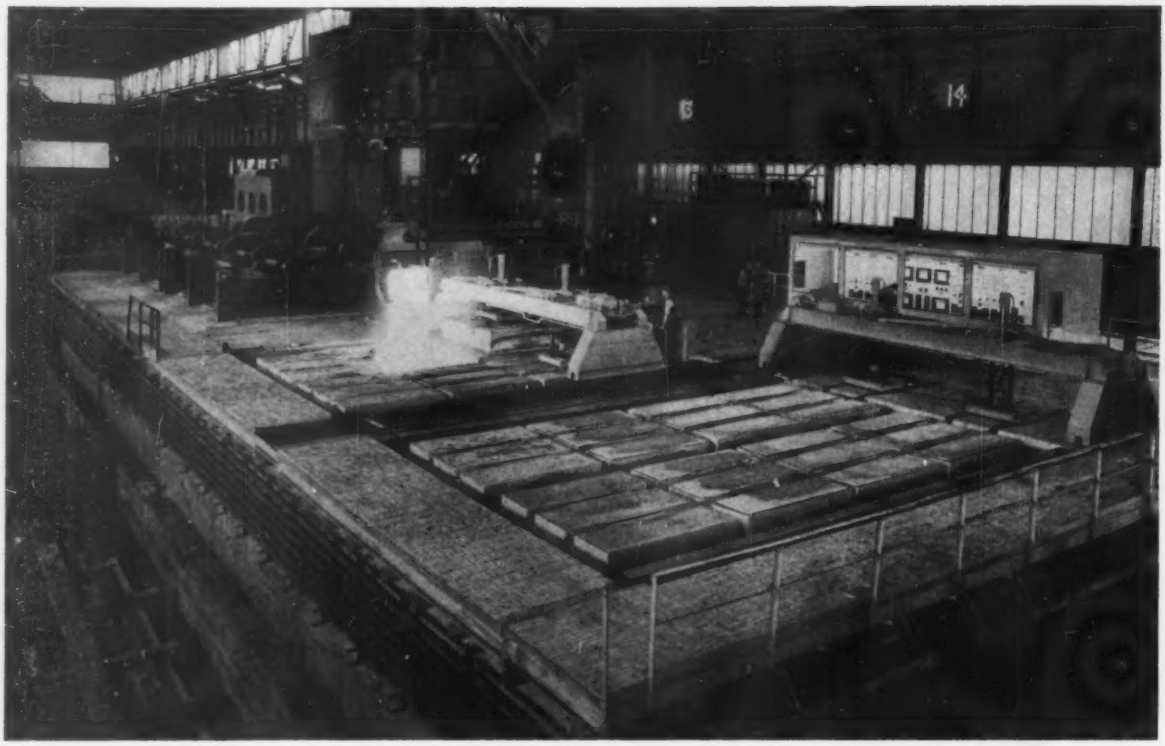


Each of the two electric soaking pits at Consett Iron Co. Ltd., in England, holds up to 175 net tons of hot ingots. Electrical equipment is at ground level behind the pits; controls are mounted on the platform

Converters May Spur Use Of Electric Soaking Pits

Coke lined refractory troughs are used as resistance heating elements; pits are said to offer close control of temperature, atmosphere, and scale formation

PNEUMATIC steelmaking processes that turn out relatively small heats frequently may help electric soaking pits gain popularity with American steelmakers.

The pits were developed in Norway by Ingenior Gunnar Schjelderup, Industriovner, Oslo. Called El-pits, they are marketed in the U. S. by Rust Furnace Co., Pittsburgh.

• Coke filled troughs are used as resistance heating elements in the pits.

Reinforced, rectangular steel casings of the pits are lined with insulation and refractories. Internal brickwork divides them into several cells, which hold one or more ingots. A cover is provided for each cell.

Coke filled silicon carbide troughs, running lengthwise in the pits, are used as resistance heaters. Most of the heat is transmitted to the ingots via radiation.

Electrodes passing through the end walls carry power from a transformer bank to the heaters. Power can be adjusted manually, but automatic controls are favored in Europe.

• Four basic types are popular; several pits can be built in a single casing.

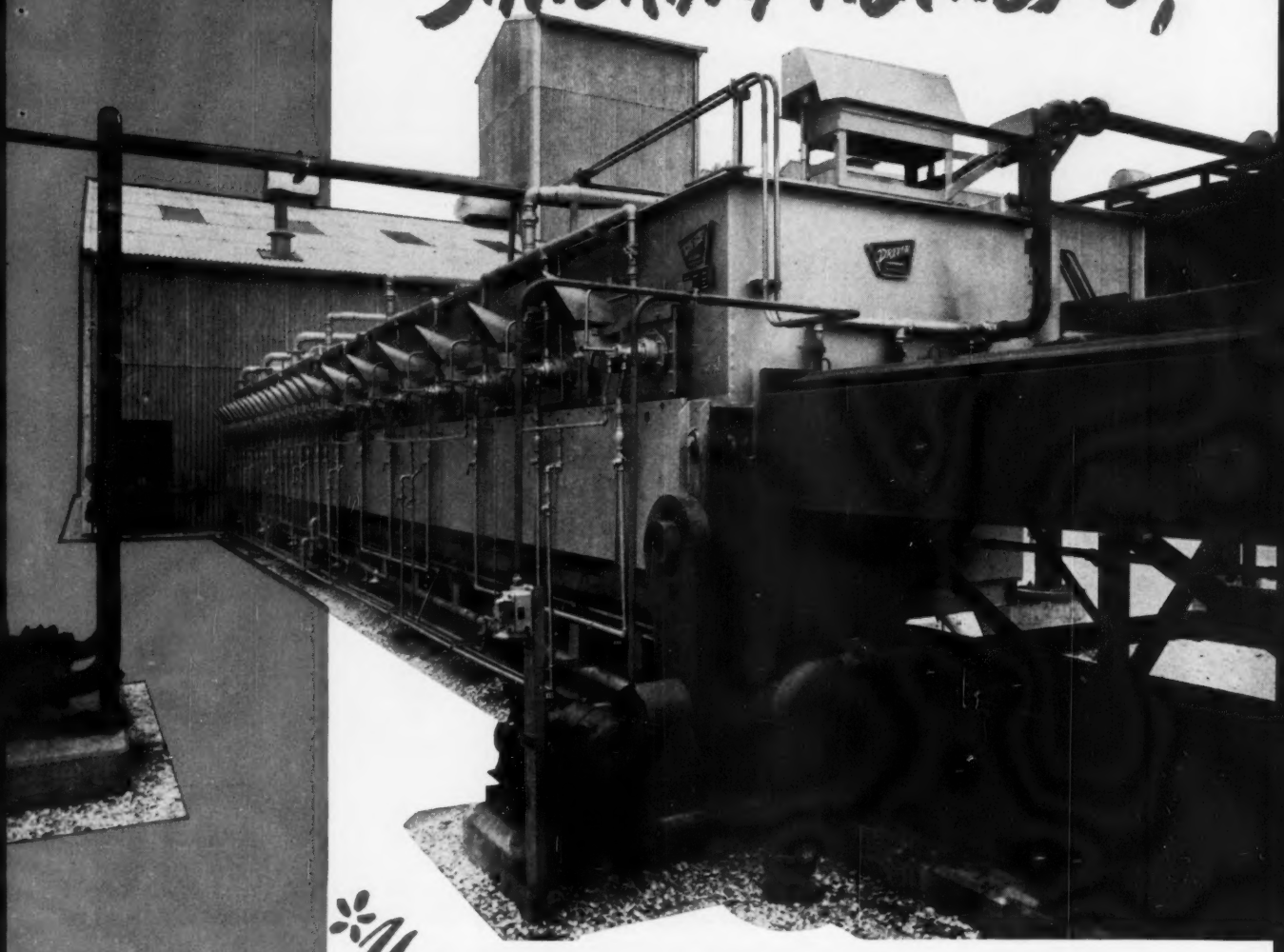
A single heating element runs through the center of one type pit. Ingots are placed in compartments on both sides of the resistor. The pit is ordinarily used to soak ingots with short track time; holding capacity is large, but reheating capacity is relatively low.

The double pit has resistors on each side and a solid partition in the center. Ingots rest against the partition; each row of ingots is heated by one resistor.

In the three-resistor pit, heating elements are mounted on each side of the chamber, and a third passes through the center. Each of the two rows of ingots is heated by 1½ resistors.

The two-resistor pit applies heat from two elements (along the side-

SINTERING AL FRESCO!



*Yes, OUT-OF-DOORS! Here's a Drever Furnace installation for sintering nickel briquettes at the plant of the Freeport Nickel Company, Port Nickel, Louisiana. Its outdoor setup eliminates the need for costly building space—but this is only one of its interesting features.

HIGH LOAD CAPACITY—AUTOMATED OPERATION

Built to handle continuous in-line 8800# per hour production of sintered nickel briquettes, this Drever Furnace combines the high loading capacity of a roller hearth with the material handling convenience of a conveyor belt furnace. It is a radiant-tube, natural gas fired, roller hearth type furnace, gas tight for controlled atmosphere operation.

NO TRAY LOADING OR UNLOADING

Material passes through the furnace on a continuous mesh belt which allows greater circulation of heat and gas for uniform production and eliminates the need for trays. Automatic handling equipment loads briquettes onto the belt and conveys the sintered briquettes from the end of the furnace for weighing and packaging.

DREVER ENGINEERING FOR YOU

This unique out-of-doors installation is an example of Drever application of sound engineering principles, and experience in the field of furnace design. Our engineering staff is available for consultation concerning your requirement—write or phone us. Drever Company, Bethayres, Pa. Phone: WIlson 7-3400.

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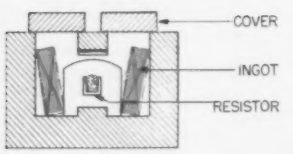
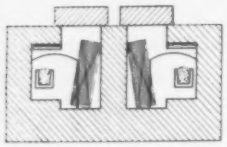
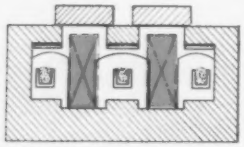
Four Elpit Types:



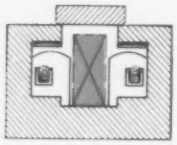
Single-resistor pit



Double pit



Three-resistor pit



Two-resistor pit

walls) to a single row of ingots in the middle. The high power, low capacity feature makes the pit useful where ingots or slabs are charged cold, or where track time, from teeming to the pits, is long.

• Electric pits offer controlled heating, controlled atmosphere, and lower capital cost.

The pits cost less to build and take less space than conventional installations, Rust engineers say. They can be loaded and unloaded more quickly; ingots remaining in the pits aren't cooled a great deal when others are taken out.

Automatic controls and resistance heaters insure uniform temperatures in the pits. Atmosphere can be controlled easily; no scale is formed on the ingots unless air is introduced for that purpose.

In some cases, it is desirable to promote controlled scale formation to remove scabs or other defects from the ingot. In one case, scale was allowed to reach a 1/16 in. thickness; when that wasn't enough to remove the imperfections, the ingot was scarfed.

• Engineering on the pits is perfected. Application information and local production techniques will indicate where they can best be used.

The electric units have been used in Norway since 1927. One reason: Electric power is priced competitively there. Present power costs in the U. S. may limit use of the pits in some areas. But costs per kilowatt hour are expected to become more competitive with fuel costs. (Some say nuclear power will be relatively inexpensive.)

Cold steel heating is said to be practicable in many applications where yield is weighed against energy cost. Normal power consumption in a typical electric pit, charged with hot ingots, and with short track time: About 22 kw-hr per ton of ingots.

• After about 1954, the pits began to appear in mills throughout Europe and in South America.

Electric pits have been installed in Italy, Finland, Sweden, Germany, France, Great Britain, Denmark, and Switzerland. Four units are being installed in Brazil.

Harald C. Bjerke, special engineer for Rust Furnace, says the pits should be particularly useful in oxygen converter steelmaking, where heats are teemed frequently. They should also be helpful to specialty steel producers, making for lower finishing costs and better yield, says Mr. Bjerke.

• Heating elements are applicable to other furnaces.

Forge furnaces and other special units can be heated with the elements. A forge furnace, installed in a French shop in 1957, is used to heat tool steel. Another was installed in the plant in 1959.

In 1958, a furnace that takes a 55 ton charge of cold ingots was installed in a Swiss plant. An English tube mill is to have a continuous pusher furnace.

Gas or oil can be used as an auxiliary preheat source in those furnaces. Before scaling temperature is reached, burners are turned off and heating is completed with electricity to control scale formation.

Coil Tilter Adds to Warehouse Efficiency

A coil tilter which lifts, transports, and tilts from horizontal to vertical in about 45 seconds is slashing material handling costs at Somers Brass Co., Waterbury, Conn.

The American Cranehand Coiltilter is made by American Forge & Mfg. Co., McKees Rock, Pa. It eliminates the use of lifting tongs, floor mounted tilting devices, and "C" hooks for handling coils up to 5000 lb.

The device is powered by two motors—one operates the grip mechanism and the other the tilting mechanism. Controls may be in the crane or in a pendant station.

• Gripping — The gripping motor moves the outside shoe against the coil and applies pressure. Final gripping is mechanically induced by movable shoes which travel down and in against the coil. The shoes are actuated by the weight of the coil. The effect is similar to gripping an object with thumb and forefinger.

Loss of power will not affect the grip on the coil since the power is off when the coil is lifted.

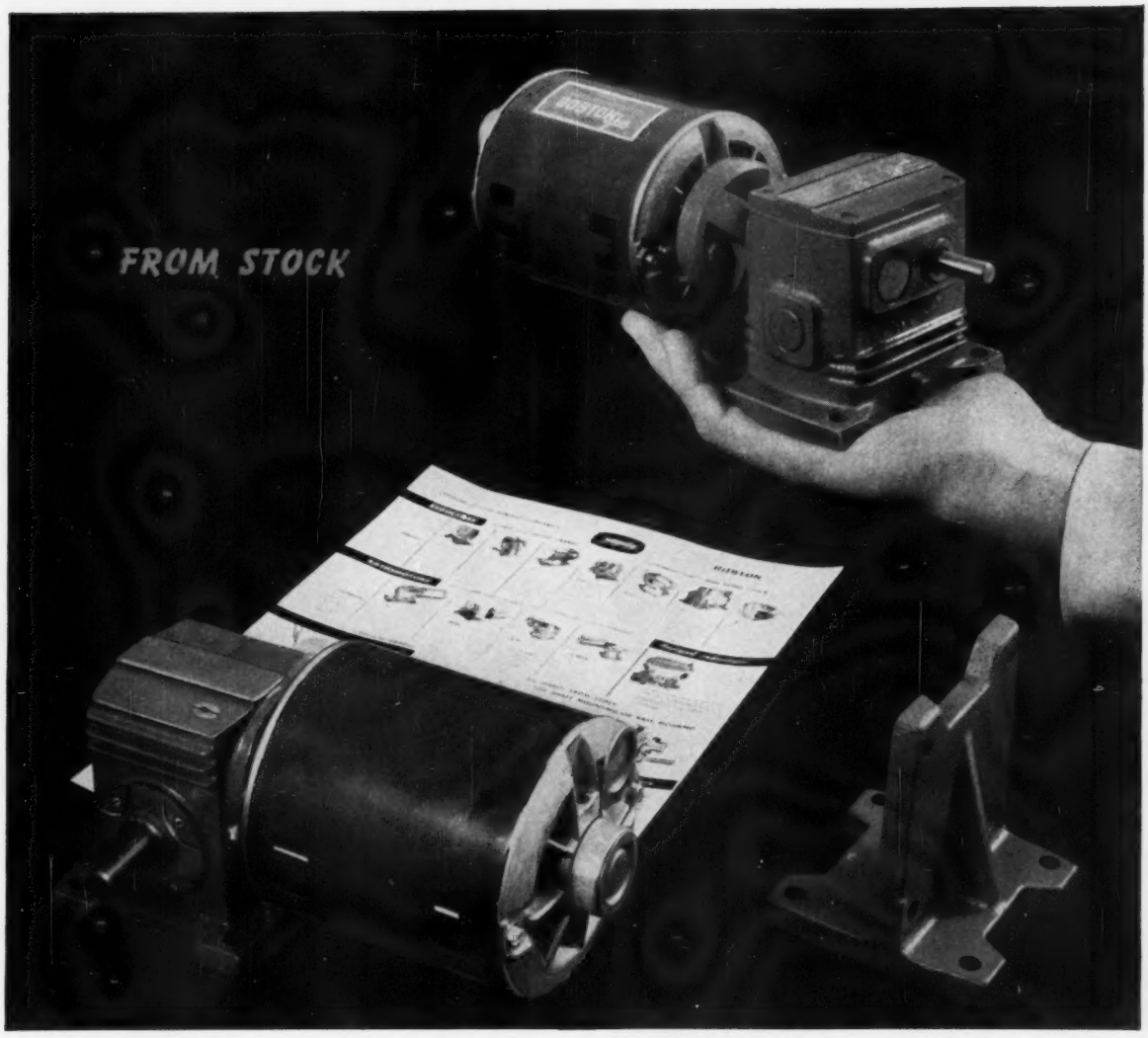
• Tilting — The tilting mechanism consists of a four bar linkage forming a toggle as the coil approaches a horizontal position. In operation, the center of the coil tilter is moved to a vertical position into the coil and the grip applied. When the coil is lifted, there is no damage since the unit is balanced. In depositing the coil, the center nose is withdrawn similar to an unbalance "C" hook.

Radiography Course Set

A course in industrial isotope radiography will be given by Princeton Div., Curtiss-Wright Co., at its Nondestructive Testing Laboratories, Princeton, N. J., June 6-10.

The course will cover source selection, darkroom techniques, and instrumentation. Teaching aids: The newest developments in shop and field testing equipment, including that using cobalt 60 and iridium 192.

The course is designed to enable students to meet licensing requirements.



THE NEW M109 Ratiomotor (foreground) for horizontal right angle drives is furnished with 1/20 hp or .035 hp motor. Output speeds range from 43.8 to 350 RPM. New standard mounting bracket shown permits easy mounting in many positions. The NEW MW109 (in hand), for horizontal parallel drives, is also furnished with 1/20 hp or .035 hp motor. Output speeds range from 1.9 to 70 RPM.

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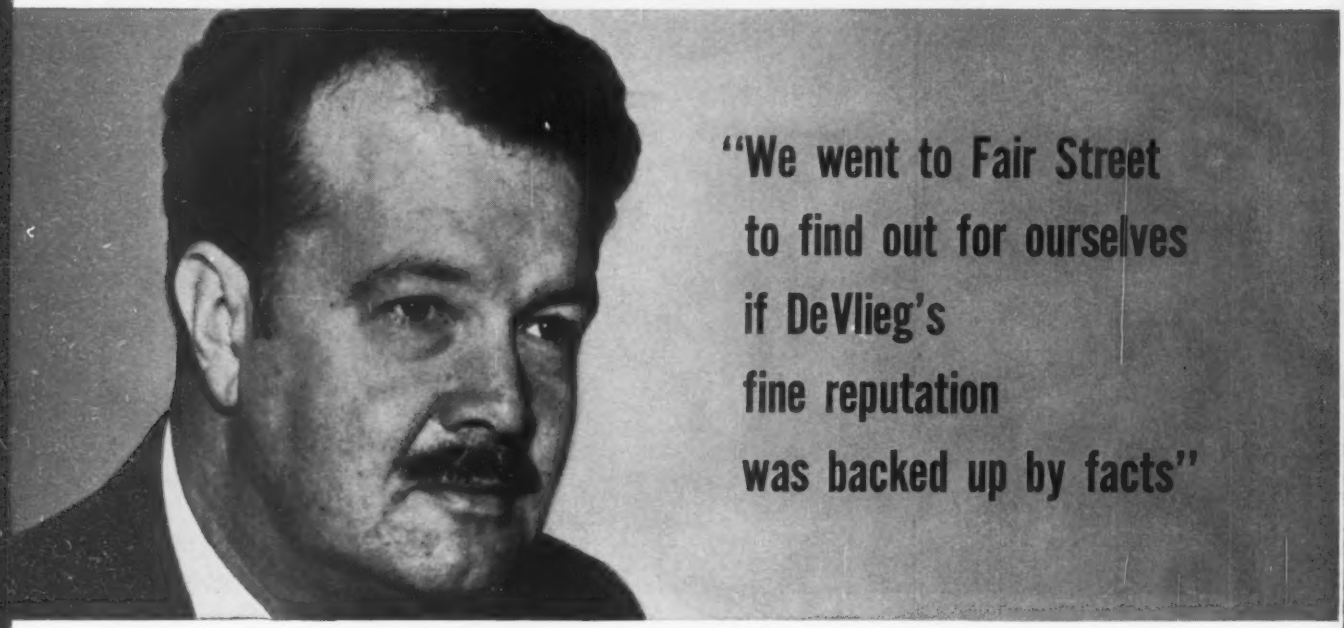

"We were convinced. We purchased two JIGMILS and they have now been in operation for several years. These machines have all the fundamentals required to produce the highest degree of accuracy, and yet, are simple to operate. Besides this, and we feel most important of all, the JIGMIL has special features which largely eliminate our reliance on the human element to produce close tolerance work. JIGMILS enable us to produce our broaching machines and broaching tools to the very highest degree of accuracy, a matter of the utmost importance in our products."

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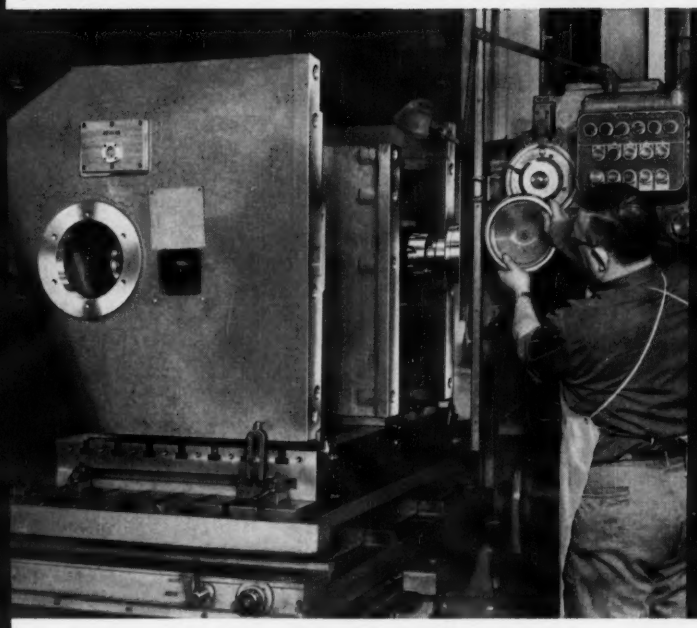

A FEW PROVEN ADVANTAGES OF THE JIGMIL TECHNIQUE

- Eliminates cost of expensive jigs and production delays resulting from their manufacture.
- Simplifies tooling.
- Employs automatic functions to reduce factors of human error even in close tolerance work.
- Makes possible greater flexibility of product design.
- Improves end product by permitting interchangeable assembly of parts without hand fitting.
- Increases production and product accuracy.

ACCURACY IS AN ECONOMY!

JIGMIL—EXTREME ACCURACY ON LARGE, WEIGHTY PARTS FOR DETROIT BROACH

Broaching machine knee, 65" long, weight 5500 lbs., set-up on a 32" x 60" index table on a Model 4B-72 JIGMIL. The knee is rough and finish milled, bored, drilled and tapped from four sides in one set-up. Formerly machined on a conventional boring mill, the job took 120 hours. The JIGMIL now completes all machining operations in 50 hours with consistent accuracy and without special tooling. Furthermore, the accuracy achieved effects substantial reductions in assembly time and improves the quality of the end product.

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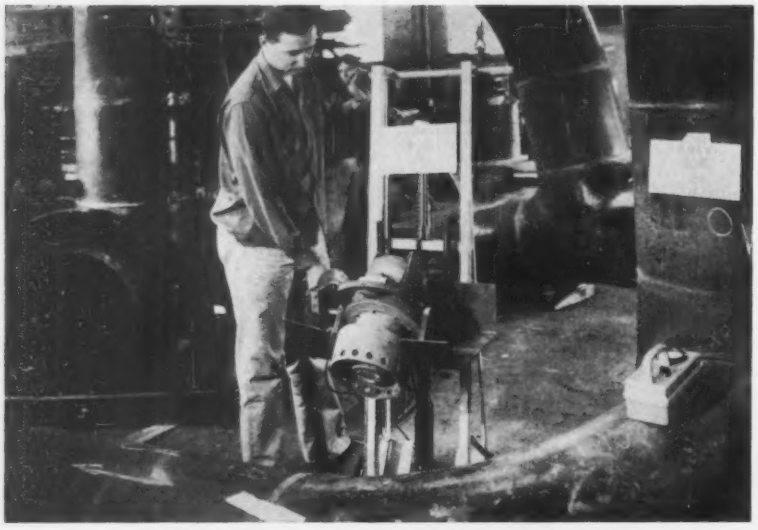


These pipe fittings will be used in a high pressure, crude oil pumping station. Semiautomatic, single pass welds pass this x-ray test

Semiautomatic Welder Ups Output of Fittings

LARGE PIPE, special sections, and fittings are being welded five times faster with a semiautomatic than with manual electrodes formerly used, says M. W. Meierhoff, president, Modern Constructors Inc., Duluth.

In addition, weld quality has been improved. The firm has had practically no rejects in nearly two years of production, says Mr. Meierhoff.

Sections run 12 in. to 30 in. in diameter. Walls range from ¼ in. to 1½ in.

The fittings must pass x-ray and 2000 lb hydrostatic testing.

• Semiautomatic welding increased weld acceptance from an average of 80 per cent to 100 per cent, eliminating the need for reworking operations at the plant. Since each assembly costs up to $3000, the improvement has resulted in substantial dollar savings.

The welded assemblies are used for dimensional manifolding to control the flow rate of gases and liquids. Tolerances must be exceptionally accurate. If a weld is faulty, it must be cut out. The part is remachined and again welded to preserve accuracy.

The semiautomatic machine (Unionarc) aids quality production because its high welding current and magnetic flux increase the length of time the puddle remains fluid. Impurities are allowed some additional time to boil out of the metal.

Welding wire is fed from a 300 lb wire reel to eliminate stub losses from electrode changes. The arc time factor is exceptionally high; deposition rate averages up to 15 lb an hour with welding currents of 400 to 450 amperes.

The increased deposition rate and penetration permit Modern Constructors to complete large pipe assemblies in three passes vs. the 12 to 14 formerly required. Preweld and interpass cleaning are usually unnecessary.

The company's work varies widely —pipe sizes run 4 to 30 in. in diameter; materials range from low alloys to high carbon steels.

Complete visibility of the arc has proved an advantage to operators who can correct troubles immediately.

Bottle Size Jet To Propel Satellite

A MILK bottle sized jet engine developed by the Research & Advanced Development Div. of Avco Corp., Wilmington, Mass., may propel future space vehicles.

Once in space, a satellite can be controlled with relatively little power. Such an engine as the 30 kilowatt arc jet can be used to make corrective changes in attitude or to rotate the satellite.

The complete propulsion system will consist of a thrust device, an electric power supply from either solar batteries or a nuclear source, and a tank of liquid hydrogen or helium. The engine weighs only 3½ lb.

Metals Are Kept Bright

A patent application has been filed by Dauber Chemical Co., Chicago, for Daubrite, a packaging material applied to prevent tarnish and oxidation of copper, brass, bronze, and cadmium.

Tests, which included high humidity and temperature exposure to heavy sulfide and oxygen atmospheres, indicate protection will last at least two years when metals are properly packaged, reports Dauber.

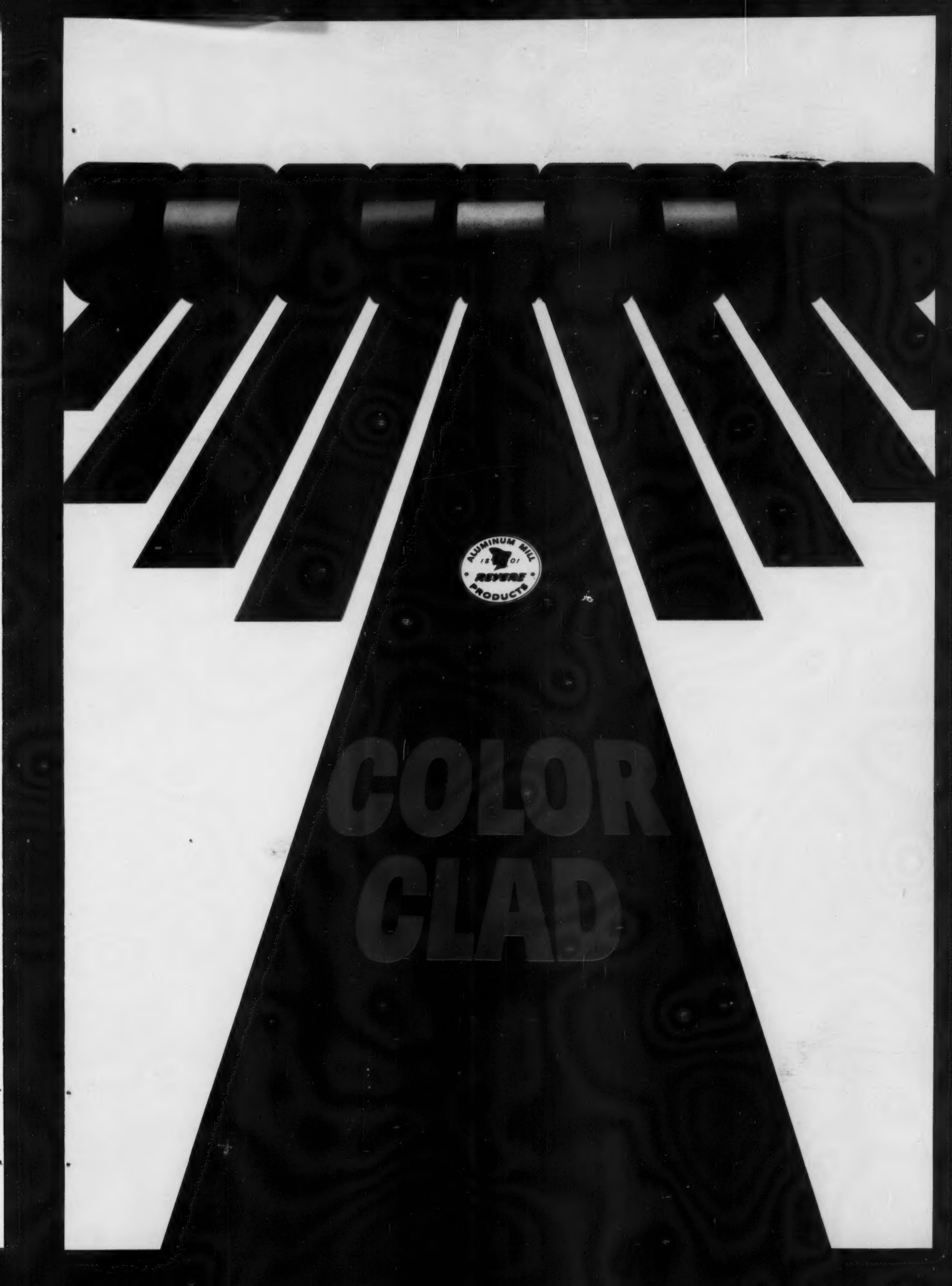
Biggest markets are expected among producers of sheet copper, brass hardware, bronze bearings, copper electronic components and printed circuits, copper cookingware, and which are cadmium plated.

New Book Instructs Foremen on Safety

Five Minute Safety Talk for Foremen, published by the National Safety Council, is divided into sections on motivation, machines and tools, materials, movement, and managing men.

Written by Robert L. Moore, superintendent of engineers, Kemper Insurance Co., the book is a collection of 52 talks based on more than 20 years of experience in safety engineering.

For further information write to the National Safety Council, 425 N. Michigan Ave., Chicago 1, Ill.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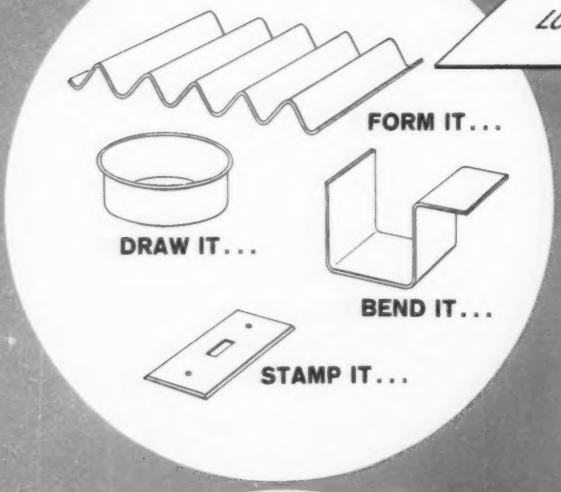

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Full, deep rich tones... light pastels... brilliant metallics... striking flamboyants.. simulated textures (linens and leather). Rich, wood grains in a variety of tones . . . three dimensional embossed plastisols . . all firmly bonded to Revere aluminum so you can form, draw, bend or stamp without cracking, chipping, scuffing or marring. Remember—Revalum won't rust at exposed edges and is light weight for easy handling—now supplied from ¾″ to 42″, .006 to .050 thick, in most alloys. When you specify Revalum you buy years of experience in the production of Color Clad Aluminum Sheet. For colors that last see Revere first.

*Du Pont's registered trade mark for its acrylic lacquers.

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Builders Ponder Pitch to Washington

TOP EXECUTIVES from most of the leading machine tool companies had a closed session at the spring meeting of the National Machine Tool Builders' Association meeting in New York to discuss their gravest problem: Their industry's waning position in the world market.

The main objective of the meeting: To find what (if anything) the machine tool industry can recommend to (or request from) the government to alleviate its plight.

• **Subjects En Route**—During the course of the discussion, the group talked about tariffs, import quotas, reciprocal agreements with a better break for U. S. manufacturers, and nearly every other type of relief.

A unified industry stand was not reached because too many different points of view were represented.

• **Not So Easy**—Five or six years ago, the industry probably would have had little trouble coming up with a policy that represented the wishes of most builders.

A host of the machine tool builders now have plants abroad or other foreign commitments. They are little interested in a trade policy that would affect those operations.

Further, many builders feel that higher tariffs, or other artificial restrictions, would only tend to lull some of industry into a false sense of security—a security, they point out, that has done nothing to protect the watch industry and others.

Most of the builders of that persuasion feel the problem must be cured in all metalworking with more efficient production.

Association President Alan C. Mattison (president, Mattison Machine Works, Rockford, Ill.) said in his address at the meeting: "People talk about tariffs. But as of today, can you imagine our Congress reversing our foreign trade policy and going all out for higher tariffs? Besides, tariffs in many cases would not be enough. The price differential is too great. No. The only way for manufacturers to meet foreign competition in the U. S. markets is to get their costs down so they can offer competitive values."

There is at least one more point on which nearly all builders agree: Today's depreciation practices stifle large scale equipment buying. Realistic provisions by Washington are musts if this country is to get its production costs fully in line.

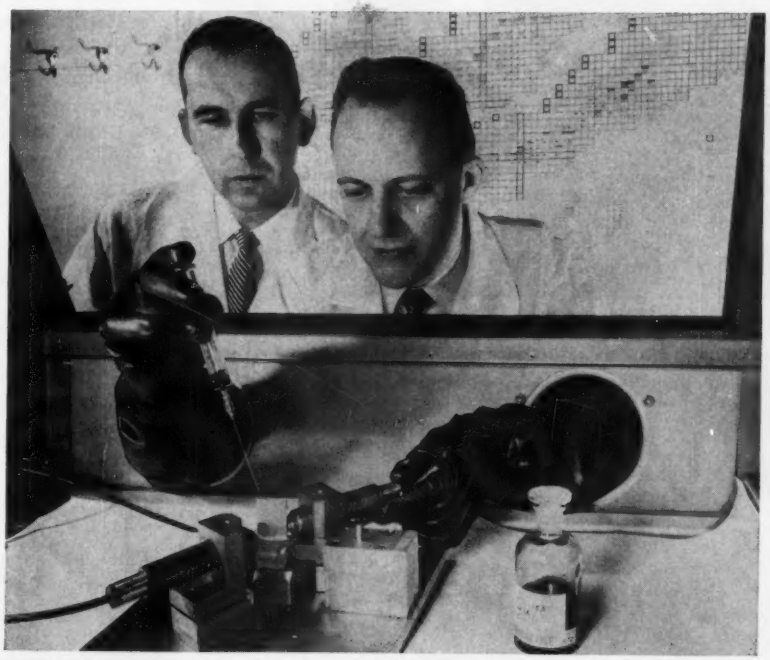
Machine Standard Snag

Standardization of general purpose machine tools is regarded cooly by most builders for several reasons (STEEL, May 9, p. 44). For example: It's conceivable that the government would adopt the approach for its purchasing.

Here's the way one builder explained it to STEEL: "The proposed standards chiefly involve basic measurements on the machines. They don't (and shouldn't) cover intangibles like rigidity, flexibility, control reliability.

"But those factors may make a difference in machine selection. If, however, the government adopts the standard measurements, then its purchasing people are almost forced to buy the cheapest machine that meets the standard, with little or no regard to the other important factors. A light duty, poorly designed, improperly built machine could grab the order, simply because the buyer is not willing to defend to his superiors his choice of a more expensive machine.

"This could mean that government would adopt a concept under which it buys mostly junk."



AN INSERTION OF RADIOISOTOPE SAMARIUM-153 aids in measuring variations in wall thickness of an experimental Allison turboprop engine's blades and vanes at General Motors Research Laboratories. Radiation from the isotope, which is dissolved in hydrochloric acid, measures the thickness of a high temperature nickel base alloy in this shielded inspection procedure. The technique may be possible with other types of small, hollow extrusions or castings whose design intricacies make gaging impossible by conventional means

This shop cuts costs by using **STANICUT Oil 137**

Machines seven metals, one plastic with this one cutting fluid

Shank Manufacturing Company, Chicago, cuts production costs three ways by using STANICUT Oil 137 BCS. (1) The 15 Warner & Swasey Lathes are never down for change of cutting fluid when the metal being worked is changed. There's no time lost with shutting down, cleaning up and changing oil. (2) There are no losses from the use of the wrong cutting fluid. (3) Floor space is used for productive machinery instead of being tied up as storage space for barrels of different cutting fluids.

Titanium, brass, alloy steel, aluminum and seven grades of Stainless plus Teflon plastic are all worked on the machines. Latest equipment, a reputation for good work, experienced operators and on-time delivery keep business coming to Shank. STANICUT Oil 137 BCS helps Shank hold down manufacturing costs.

Does cutting costs with a cutting fluid interest you? Let one of Standard Oil's experienced lubrication specialists show you how STANICUT Oil 137 BCS can do it. Call the Standard Oil office nearest you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

Commercially pure AMS 4921 Titanium oxygen injector nozzle gets an inspection from Frank Kruppe, Shank president (right), and Standard Oil's Henry Krueger. Hank Krueger provides Shank plant with technical service on cutting fluids and lubrication. Hank has the experience for this work. He's been doing it for six years. He has an engineering degree from Illinois Institute of Technology and has completed the Standard Oil Sales Engineering School course.

Quick facts about STANICUT OIL 137 BCS

- Has excellent extreme pressure properties. Ideal for low machinability steels.
- Has medium-low viscosity. Low enough for rapid, cooling flow. High enough to avoid "fogging".
- Non-corrosive to aluminum, *titanium* and all steels, tools and machines.
- Sterile, non-irritating and non-toxic.
- Suitable for many operations—tapping, threading, drilling, gear shaving, broaching, etc. Gives excellent tool life.

You expect more from **STANDARD** *and you get it!*

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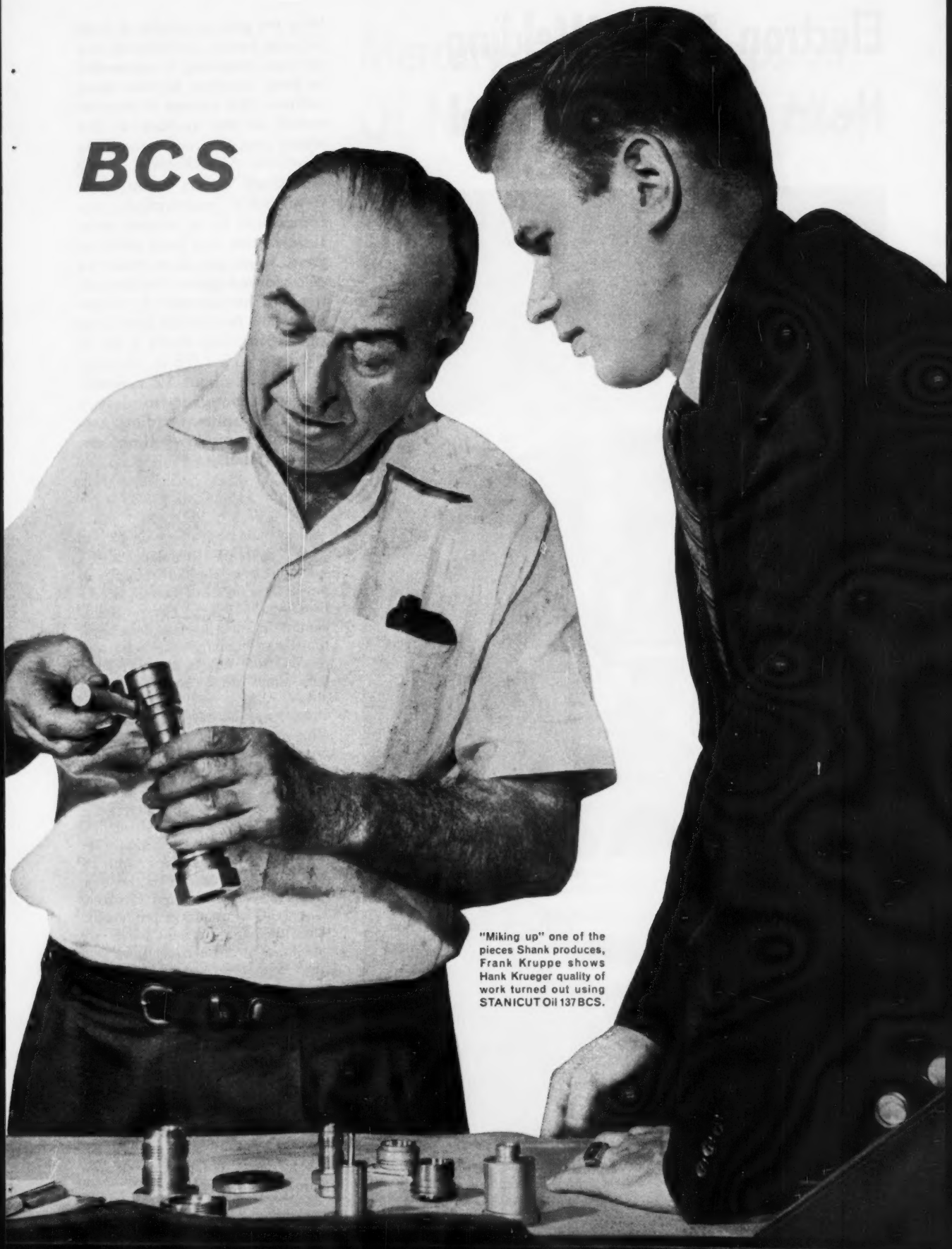
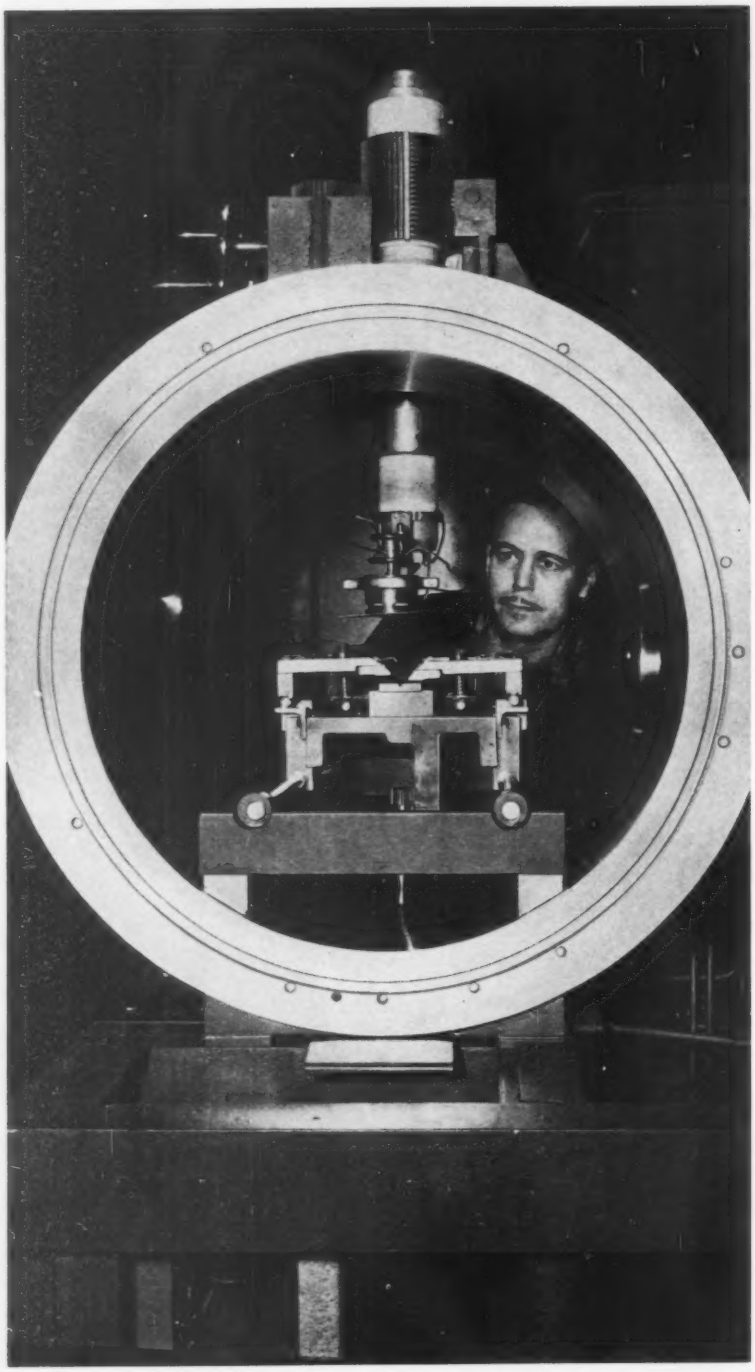


"Miking up" one of the pieces Shank produces, Frank Kruppe shows Hank Krueger quality of work turned out using STANICUT Oil 137 BCS.

Electron Beam Welding Nears Production Level



The operator is looking at a buttweld fixture, which has a horizontal movement. Some of Sciaky's equipment is being tested at Republic Aviation

How the process works: A high velocity beam of electrons in a vacuum chamber is converted to heat as they hit the work surface. The energy is concentrated at the surface of the metal and is great enough to overcome conduction. The workpiece shows deep, uniform weld penetration, accompanied by a narrow weld fusion zone and heat affected zone. Joints are clean and free of absorbed gases. No impurities are introduced. An average shop technician can weld a 1/16 in. cap that's 3 in. in diameter to a 1/16 in. Zircaloy cylinder in about 12 seconds. The weld time for stainless is about the same. Loading, setup, and pumpdown times are not included.

ELECTRON BEAM welding is in a stage between the laboratory and production, says Bill Farrell, Sciaky Bros. Inc., Chicago. The process is gaining in importance as data about the effect of impurities on refractory metals, exotic metals, and even common alloys are accumulating.

• **Advantages**—Since a high vacuum (below 2×10^{-4} mm of mercury pressure) is necessary for operation, the level of atmospheric impurities is less than 1 part per million. Commercially available inert gases are pure to a level of about 100 parts per million, says Sciaky.

Nonmetallic inclusions with a lower melting point than the base metal are vaporized and removed. The weld is usually more ductile than the parent metal. Joints are said to be stronger than those produced with the conventional fusion welding processes and are better able to distribute stresses through ductility.

• **Uses**—The equipment is suitable for several process applications, says Mr. Farrell: 1. Welding of refractory metals. 2. Welding of metals with high thermal conductivity. 3. Joining highly reactive metals. 4. Making welds not possible or adequate by other methods.

• **Atomic Energy**—Sciaky says its French plant has sold production equipment—chiefly for the French atomic energy program. It is the only process used in France to clad and seal fuel elements. Because of the proximity of the weld to the fuel, it's impossible to make the seals with conventional welding methods without danger of contaminating the cladding with fuel material.

• **Thermocouple Junctions** — The small junction is made rapidly, avoiding undesirable side effects such as diffusion of the junction or the introduction of impurities. The needle sharp hot zone makes the focused beam useful for fine wires.

• **Electron Tubes** — Electron tube parts joined by the electron beam are clean, and no oxide content is introduced during fabrication. The weld zone is fully degassed instead of gas saturated.

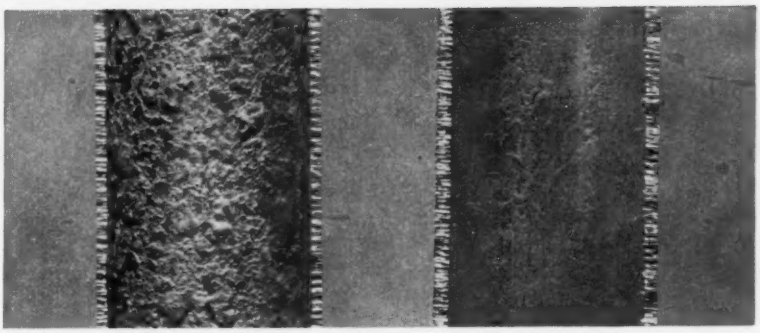
• **Copper** — Copper and copper based alloys can be easily welded without preheat and without oxidation. Even clean copper is brighter after electron beam welding.

• **Beryllium**—Grain size influences the physical properties of this metal. The method keeps grain growth to a minimum. Freedom from oxidation should contribute to the safety of fabrication.

• **Ceramics** — Ceramics can be melted almost as rapidly as metals. There is some darkening of the ceramic to indicate reduction by a combination of ionization and low ambient pressures. The method might be applicable to the production of ceramic-to-metal seals. Other possibilities: Continuous annealing of strip metals, metallizing, crystal growing, vacuum brazing, machining, and zone refining.

• **History**—One of the first mentions of the process is a U. S. patent dated Mar. 26, 1907. The inventor, Marcello von Pirani, intended to use the beam for vacuum melting of filament material for incandescent lamps. One of the first known welding applications was by J. A. Stohr of the Commissariat a' l'Energie Atomic en France.

Mercury Checks Corrosion Of New Copper-Base Alloy



Tubes removed from same condenser show difference in corrosion attack after acid cleaning. Alloy 77 tube is at right

THE ADDITION of mercury is said to give a new copper-base alloy unusual resistance to biofouling, dezincification, and other forms of corrosive attack.

Alloy 77, developed by Bridgeport Brass Co., Bridgeport, Conn., contains 70 per cent copper, 30 per cent zinc, and 0.05 per cent mercury. It is yellow in color, with physical and mechanical properties similar to those of inhibited admiralty brass.

• **Resists Biofouling**—The alloy is used principally as condenser and heat exchanger tubes where fresh or saline waters support the growth of slime or algae. Biofouling occurs when the surface of the copper-base alloy becomes covered with a layer of bio-organisms. That condition contributes to corrosion and impairs heat transfer.

Residual slime and algae have little affinity to the alloy, simplifying their removal—in some cases, rinsing with water is sufficient.

• **Other Cleaning Methods**—Scale can be removed by normal mechanical cleaning procedures. (Again, mercury reduces the buildup of water deposited scale.) Other corrosive attacks, such as pitting, are considerably arrested.

Because Alloy 77 contains mercury, a built-in algicide, both the duration and concentration of chlorine treatments can be reduced, leading to economies in operating costs.

• **Extensively Tested** — Field and service installations include prolonged exposure to clean sea waters, brackish waters, polluted sea waters, and fresh water, many containing organic materials and silt.

Alloy 77 condenser tubes were installed at a powerplant near Tampa, Fla. After 26 months of service in polluted sea water, the tube walls were still within the original 18 Birmingham wire gage (0.049 in.).

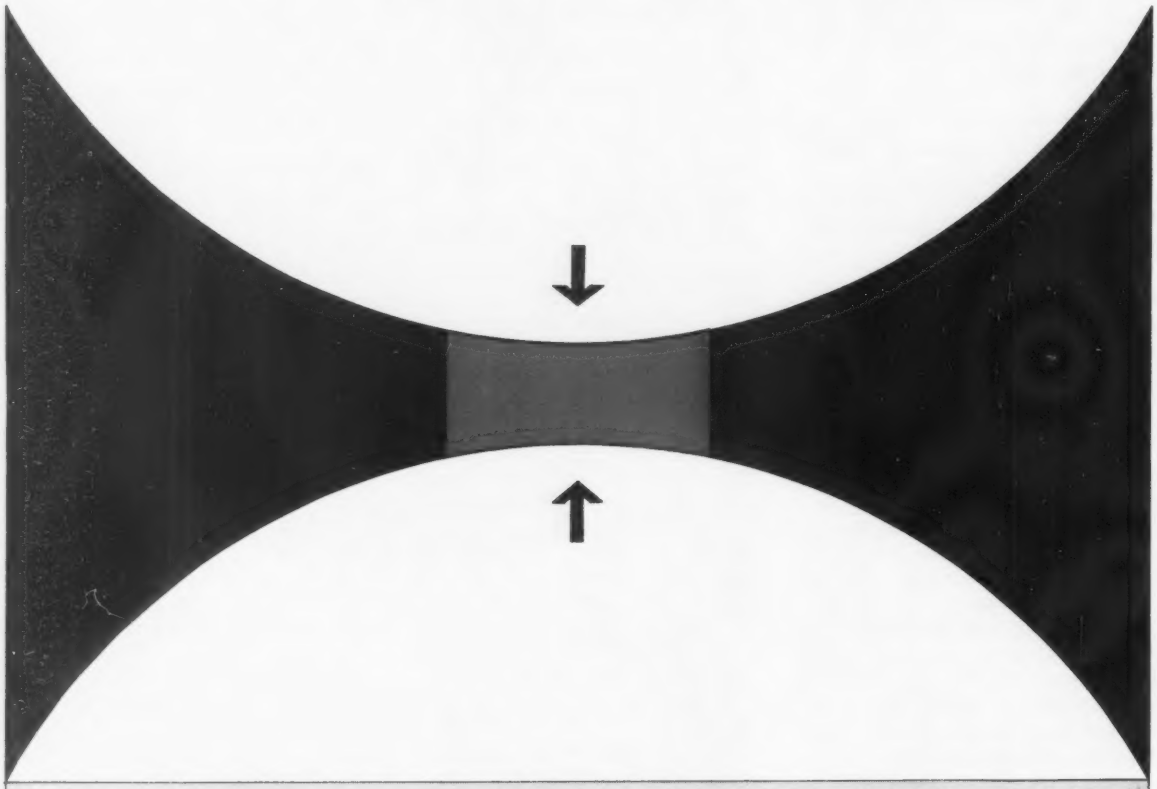
A condenser at an installation on a bayou near Houston was relatively free from organic deposits after five years of service.

Tubes have also passed tests in the petroleum industry.

• **Installation** — Condenser tubes conform with ASTM specification B-111 (except for chemical analysis). They are annealed and suitable for roller expansion. Most of the power tools on the market can be used for roller expanding the material, reports the company.

Sizes of condenser tubes available: $\frac{5}{8}$ to 1 in. OD; wall thicknesses, 0.049 (18 BWG) to 0.065 in. (16 BWG). Tubes can be obtained with thickened centers for return bend applications. The material can also be used as cladding or lining in duplex tubes.

You'll make better connections with **Western Brass**, because brass is easily—and firmly—welded, brazed, or soldered. With Western Brass you have the added confidence that comes from working with metallurgical specialists who analyze your blueprints to guarantee that you get sheet or strip in the right alloy, temper, grain size, gauge, and finish. You'll make it better with easy-to-bond brass. And you'll make it best with Western Brass—it's "tailor-made" to your individual requirements.



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Western BRASS

Heater Fuses Frit on Pipe, Inside and Out

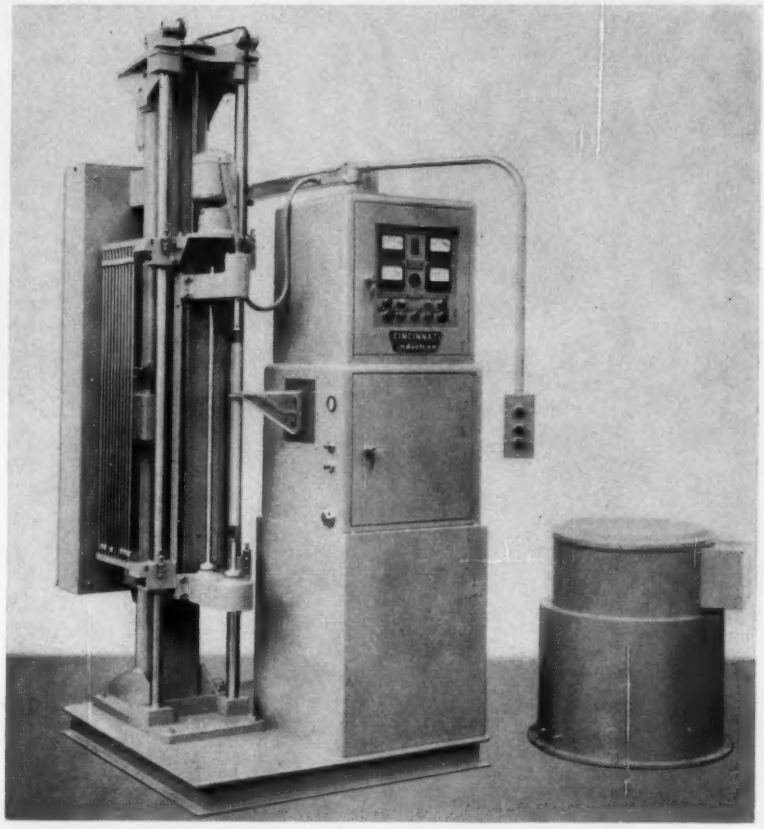
THIS INDUCTION heating machine fuses frit or a ceramic coating on the ID and OD of pipe 1¼ in. in diameter and 18 in. long. The unit is rated at 30 kw.

Of building block or modular design, it has a portable monitor control panel mounted on a portable heating station. A scanning mechanism spins the part and advances it vertically through the heating coil.

Power is supplied by a motor driven, vertical generator. It's a water cooled, "heteropolar," inductor, alternating type with brushes. The scanning unit has limit switch control of heat and quench cycles and preset feed rates. Infinitely variable feed rates are provided by a direct current, electronic motor drive. The carriage is counterbalanced to reduce drag and improve speed regulation.

Multicircuit timers control spot heating applications. The portable monitor control panel has a control section and a power section.

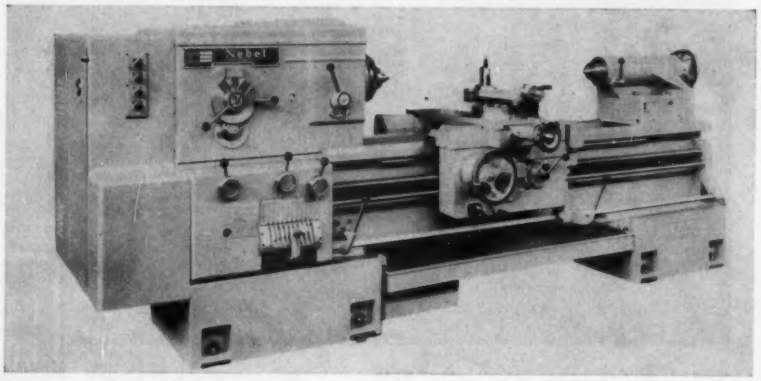
For further information, *write* Meta-Dynamics Div., Cincinnati Milling Machine Co., 4701 Marburg Ave., Cincinnati 9, Ohio.



Standard Duty Engine Lathe Has Speeds to 1500 rpm

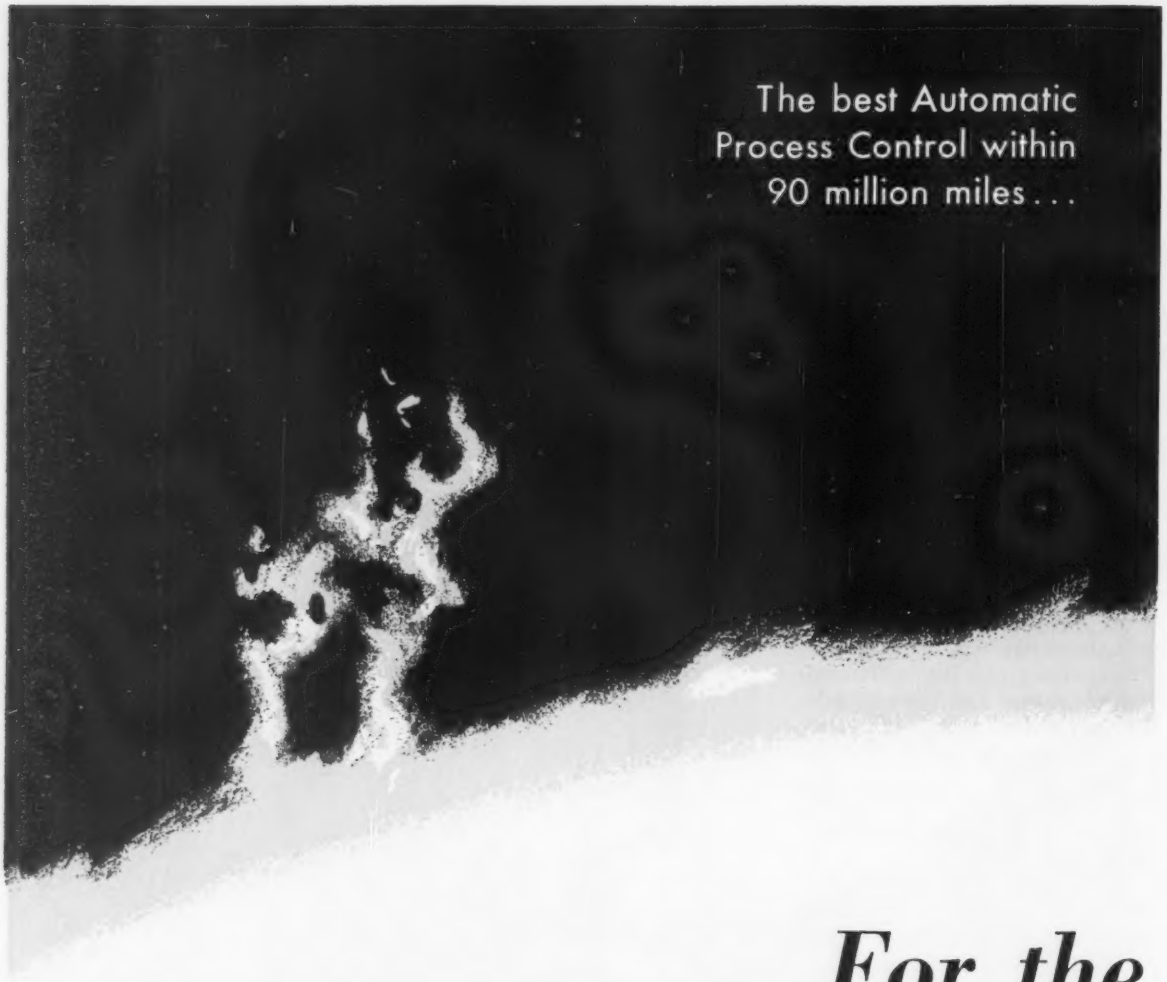
A TOTALLY enclosed gearbox is incorporated in the Model SD 2516-20 standard duty engine lathe. It has more and higher spindle speeds than previous models. The quick change gearbox has a tumbler gear arrangement.

Sixty separate feeds from 0.0027 to 0.192 inches per revolution and 60 separate thread changes (from 1 to 72 threads per inch) are selected by removing the shifting handle to the desired feed or lead shown on the direct reading tumbler index plate.



The unit has 18 gear driven speeds. You can get speeds up to 1500 rpm. The selective gear design engages only the gears required. A constant speed main drive motor supplies up to 20 hp through a multiple disc clutch and brake mounted externally on the headstock.

For further information, *write*



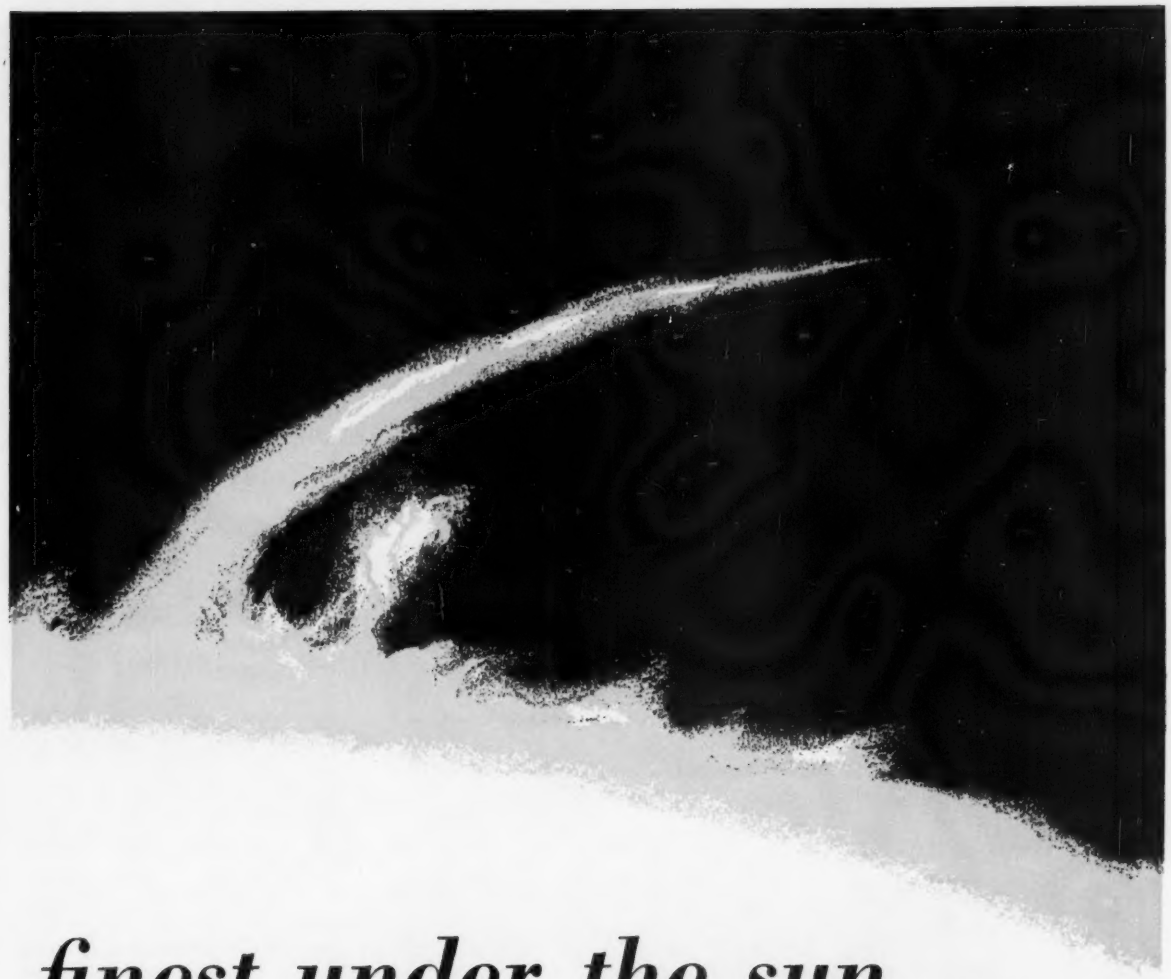
For the

A battery of Wheelco Model 407 Saturable Reactor Control System Capacitrols maintain temperatures of creep-test furnaces at a leading midwestern industrial research laboratory. Control is outstanding — within ±1° F, in some instances — over a temperature span of 400° to 2200° F. Accuracy, reproducibility, and low maintenance expense were the primary reasons for selecting Wheelco.

BARBER COLMAN

The Mark of Quality

Industrial Instruments • Automatic Controls • Air Distribution Products • Aircraft Controls • Electrical Components •



finest under the sun... Wheelco Process Control

Controlling solar fusion is a little beyond us — right now. But for down-to-earth process control problems, Wheelco will furnish practical answers. A Wheelco system can be "custom-fitted" to your needs — so wide, versatile, and varied are the Wheelco standard lines of indicating-recording-controlling instruments, combustion safeguards, and gas chromatography systems. Include Wheelco in your process control plans — factory-trained and field-experienced engineers at your nearby Wheelco Branch Office will be glad to help you.

WHEELCO INSTRUMENTS DIVISION

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Rockford, Illinois, U.S.A.

Barber-Colman of Canada, Ltd.
Dept. E, Toronto and Montreal, Canada

Export Agent: Ad. Auriema, Inc., N.Y.

BARBER-COLMAN COMPANY

Small Motors • Overdoors and Operators • Molded Products • Metal Cutting Tools • Machine Tools • Textile Machinery

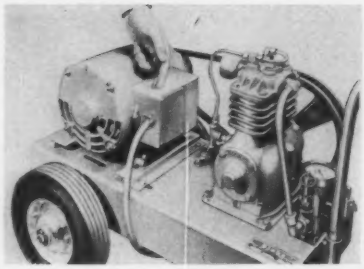
Nebel Machine Tool Corp., 3406 Central Parkway, Cincinnati 25, Ohio.

Design in Portable Compressors Refined

IMPROVEMENTS in Binks portable compressors include an on-off switch for the Model 33-1118 (electric motor drive) and recoil starting of the Model 33-1129 (gasoline powered). Both units have operating pressures of 70 to 80 psi. Air compression rates are 4.4 cfm for the Model 33-1118 and 5.7 cfm for the Model 33-1129.

Both models are complete with underslung air receivers and are mounted on heavy duty chassis with rubber tired wheels.

The compressor is a two cylinder, single stage, air cooled type with a constant speed unloader and splash lubrication. Standard equipment includes safety valve, drain valve, air outlet valve, and air gage.



For further information, *write* Binks Mfg. Co., 3114 Carroll Ave., Chicago 12, Ill.

Lift Trucks Use Stand Up End Control Design

FORK LIFT trucks with automatic drive are being made by Mobilift Co. Model ET-68 with a 2000 lb capacity is the first of a complete line. It's powered by a three cylinder, air cooled engine rated at 15 hp.

Specifications: Load center, 15 in.; mast height, 68 to 109 in.; free lift, 38 in.; travel speed, 6 mph; loading lift speed, 45 feet per minute; weight, 3600 lb.

For further information, *write* Mobilift Co., Hopkins, Minn., a division of Minneapolis-Moline Co.

Portable Air Drills Run up to 15,000 rpm

A LINE of powerful, compact air drills in straight and offset models has been introduced by Thomas C. Wilson Inc. The series (93) has drilling capacities up to 3/8 in. and

a choice of seven speeds for drilling of materials such as steel, cast iron, brass, aluminum, and plastic. They're available in straight models with lever throttle or pushbutton throttle, and offset grip models with trigger throttle. Weight ranges 2 1/8 to 3 7/8 lb. You can get speeds from 500 to 15,000 rpm.

The units have high torque, four blade motors, built-in lubricators and speed regulators, adjustable exhaust deflectors, and hardened, ground, and honed cylinders.

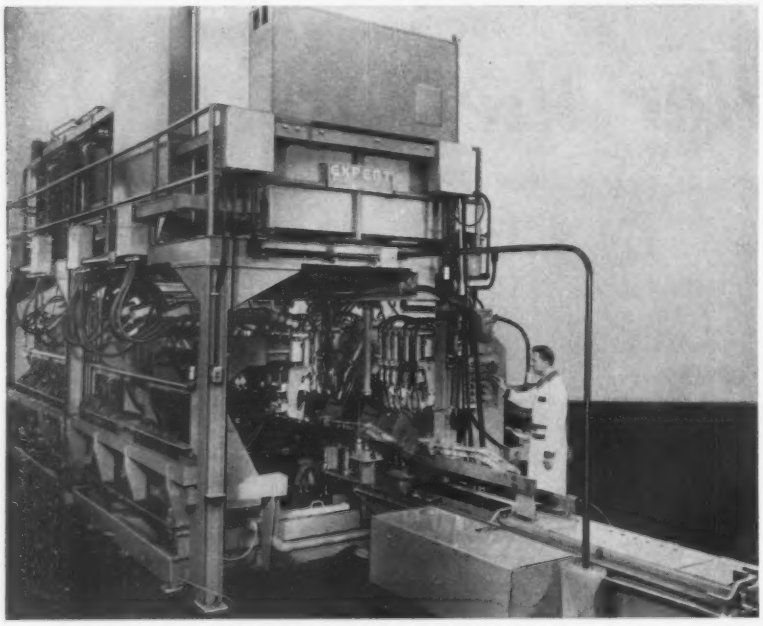
For further information, *write* Thomas C. Wilson Inc., 21-11 44th Ave., Long Island City, N. Y.

Electric Furnace Has Heat Range to 1350° F

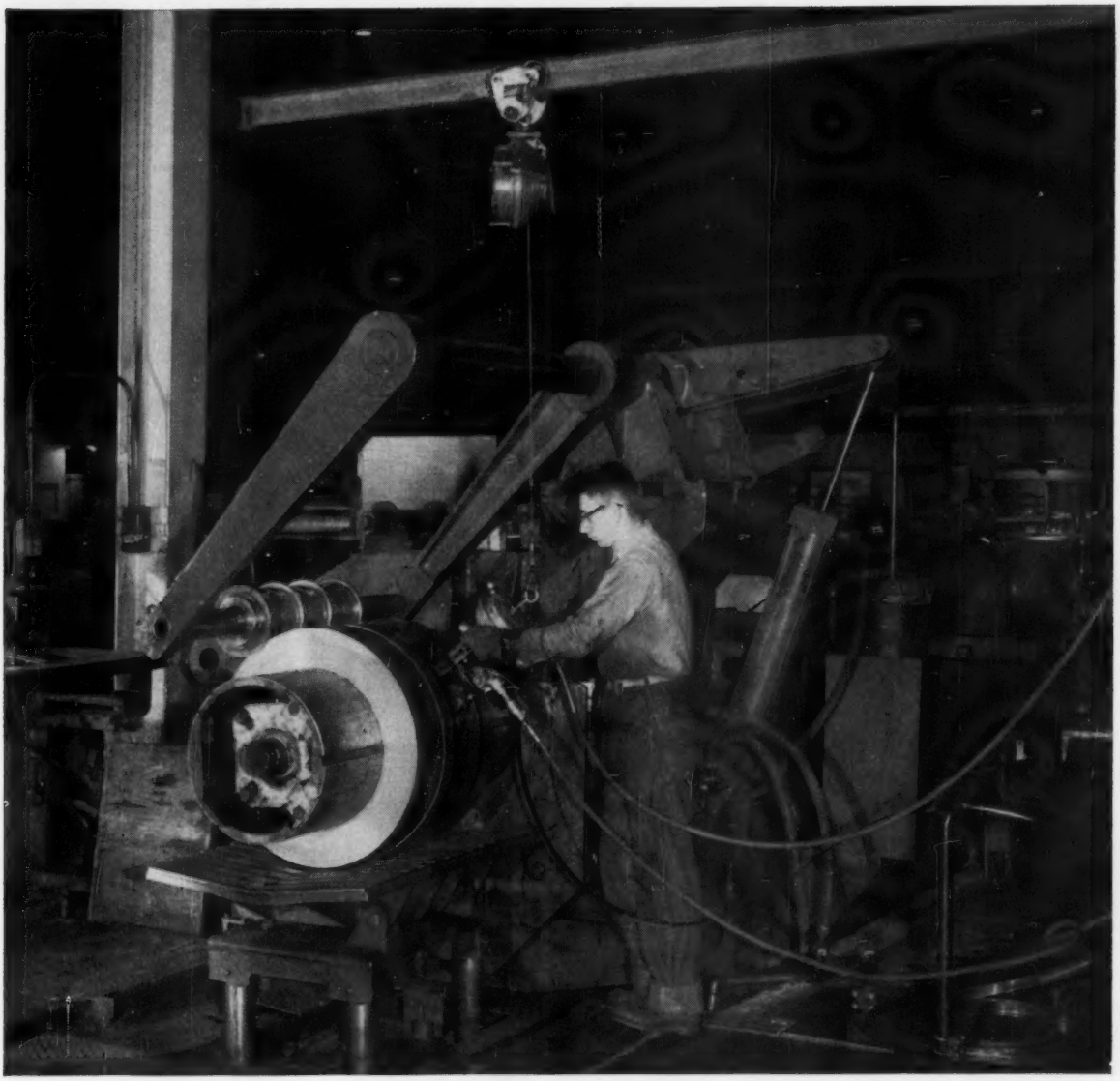
THE ELECTRIC Whirlblast furnace with convection heat flow design has a temperature range to 1350° F. High air velocity with extra air volume penetrates dense loads, provides fast heat recovery, and maintains uniform temperatures.

Inside work chamber measurements range from 24 x 18 x 18 in. to 72 x 42 x 42 in. It's recommended for use with protective at-

(*Please turn to Page* 159)



AN IN-LINE TRANSFER, AUTOMATED WELDING MACHINE performs 55 direct welds in an assembly at a production rate of 165 parts per hour at 80 per cent efficiency. Parts are transferred from station to station by a mechanical, self-contained reciprocating shuttle transfer. The 66 in. transfer stroke takes 2 seconds. Each welding station is fired in sequence and only half of the guns in each welding station are fired at one time, easing power requirements. Current is supplied by thirty 100 kva transformers. For further information, **write** Expert Welding Machine Co., 17144 Mt. Elliott Ave., Detroit 12, Mich.



Strip steel coils strapped fast

With a Signode air-power tensioner and air-power sealer, this operator puts a strap around a coil complete in a few seconds. Straps are uniformly tight and securely sealed. Strapping the coils on the mandrel simplifies further handling. The strapping is taken directly from the dispenser behind the operator. There's no waste of strap.

This time-saving use of Signode steel strapping is one of many hundreds in major steel mills and in steel service centers across the country. It is typical in that the method—of which the right strapping tools are a part—is near-perfect for the job because of the interested attention of an experienced Signode man. May we have such a man help you? A new 4-page folder, "Air Power Tensioners and Sealers" is yours for the asking. Write for your free copy today.

First in steel strapping

SIGNODE STEEL STRAPPING CO.

2645 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

Don't Price Yourself Out of the PLUS Features You Get with SQUARE D CONTROL CENTERS

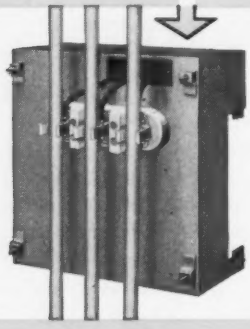
Industrial construction
All outer surfaces and structural parts are 12 gauge steel. Corner channels, cross members and doors are *formed* on special dies for maximum rigidity. Rust-resisting finish—phosphatized plus *baked* enamel.

Saves space
Unit heights in *3-inch* increments—an exclusive Square D advantage which permits use of units with minimum heights, eliminates the wasted space typical of modular systems.

Built-in safety
Units are metal-enclosed to confine damage should a fault occur. Unit side plates are permanently attached—can't be accidentally discarded. Switch-type units have visible blade disconnects for added safety.

Extra control flexibility
A variety of removable panels accommodates up to four oil-tight push buttons and pilot lights.

Tubular vertical buses
Another Square D "exclusive"—inherently stronger—greater cooling surface. Extra-wide spacing between phases gives added "breakdown" protection. Plug-in stabs are silver-plated copper backed by steel springs—give high pressure low resistance contact at all times.



Liberal wiring space
Wiring channels are *large and accessible.* No wire fishing through narrow passageways—wires can be laid in position—less costly installation.

GET THE COMPLETE STORY

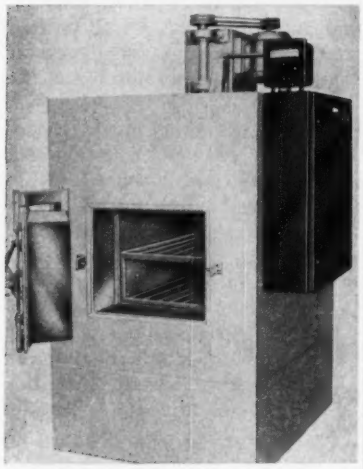
BULLETIN SM-244 gives detailed information on all of the "plus" advantages you get when you specify Square D motor control centers. Send for a copy. Square D Company, 4041 North Richards St., Milwaukee 12, Wis.

SQUARE D COMPANY

wherever electricity is distributed and controlled

NEW PRODUCTS and equipment

(*Continued from Page* 156)



mospheres for such operations as aging and solution heat treating of aluminum, brass annealing, and tempering.

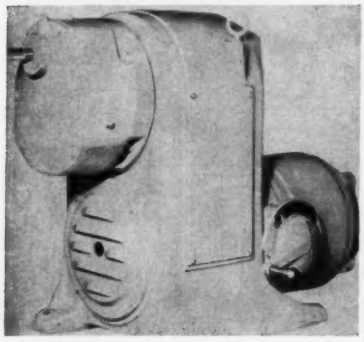
Swinging plug type doors protect the operator from the hot side. Open coil heaters are mounted on each side wall to reduce furnace size. The interior is made of 304 (18-8) alloy. No refractory brick is used.

For further information, *write* Despatch Oven Co., 619 S. E. Eighth St., Minneapolis, Minn.

Variable Speed Drive Operates at 25,000 rpm

WITH U. S. Motors variable speed drive (Type VEU-GHY), sustained operation is possible at speeds from 2500 to 25,000 rpm. Dripproof, totally enclosed, or explosion proof motors rated up to 5 hp can be had on special order.

The unit with the combination motor and transmission stands less than 2 ft high. External gearboxes,



It would take you over three months to walk past Harper's complete stock of **corrosion-resistant fastenings...**

Harper manufactures and maintains the world's largest stock of standard and non-standard fasteners in Stainless Steel, Brass, Monel, Silicon Bronze, Naval Bronze, Aluminum, Copper, Titanium, and other corrosion-resistant alloys. Harper's operation is complete—from elements, billets and extruding to rolling and fabricating parts—uniform quality control that assures you of the finest parts that money can buy, yet includes the economies that only an integrated operation can realize. This is another important difference that separates Harper from other fastener companies all over the world. Harper distributors everywhere maintain complete stocks for immediate delivery. See your Yellow Pages.

Write for your free copy of new, factual, informative 24-page "CORROSION GUIDE."

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ANOTHER BIG HARPER Difference!

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Add 5 to 8% increase to your Alloy, Stainless or Carbon Steel production without

investment in plant or facilities

Use Soffel's THERMOTOMIC SIDEBOARDS in BIG END DOWN MOLDS

Get these *Money Saving* ADVANTAGES

- ★ 5 to 8% increased yield
- ★ eliminate conventional hot tops
- ★ produces metallurgically sound ingots of fully killed steels in Big End Down molds
- ★ easier, faster ingot stripping of Big End Down molds
- ★ reduced track time
- ★ pour straight up—don't stop at the junction
- ★ eliminate back pouring
- ★ no clean up necessary at stripper or soaking pit
- ★ sideboards are light weight—easily placed in head of mold by one man—no crane necessary
- ★ less storage space needed
- ★ longer mold life—less mold cost—less mold inventory to carry

The most completely flexible hot topping method available anywhere.

Arrange a test today

Phone NAtional 5-1571 or write

Pittsburgh Metals Purifying Co.

MARS, PENNSYLVANIA

belts, or pulleys are eliminated. The gears are honed for precise profiling and superfinish. A U. S. Orifeed metered lubrication system prevents overlubrication and churning of the lubricant.

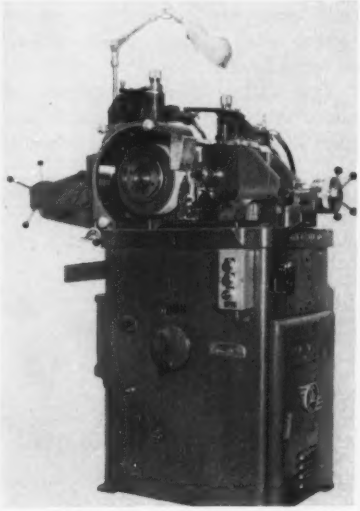
Several such units are in service for aircraft component testing and high speed emulsification. Other uses include field testing, generator testing, high speed hydraulic pumps, centrifuge applications, turbine, jet and rocket engine part testing, polishing, scribing, static balancing, and ultrahigh speed agitation.

For further information, *write* U. S. Electrical Motors Inc., Box 2058 Terminal Annex, Los Angeles 54, Calif.

Grinder Finishes Tungsten Carbide to 0.0002 in.

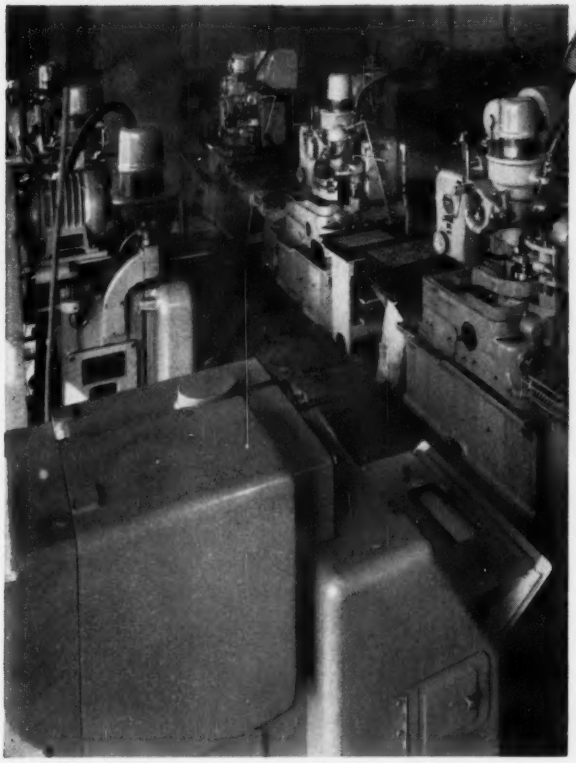
WITH the Model CG-12 centerless grinder, you can handle multiple diameter parts and intricately shaped profiles. It can grind materials such as tungsten carbide, stainless or carbon steel, glass or plastic to 0.0002 in. or 6 or 8 micro finish. Nonferrous metals, fiber, hard rubber, ceramics, cork, and wood can also be ground.

The unit has high output and fast checking with both sides of the wheel accessible from operating position. The coolant tank is mounted on casters. Wheel dressers can be either manually or hydraulically operated. The regulating wheel spin-



FELLOWS GEAR PRODUCTION EQUIPMENT

Builds Extra Quality at Lower Cost for STANLEY



View of production floor at Stanley Electric Tools, showing some of the Fellows Gear Production Equipment used.

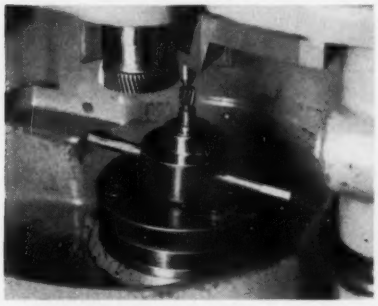
Stanley is a name you know . . . a name that stands for high quality in electric tools.

To insure this quality, while providing the high production rates that mean lower costs, Stanley Electric Tools, Division of The Stanley Works at New Britain, Conn., uses Fellows Gear Production Equipment for shaping, shaving and inspecting the armature pinions for its electric tools.

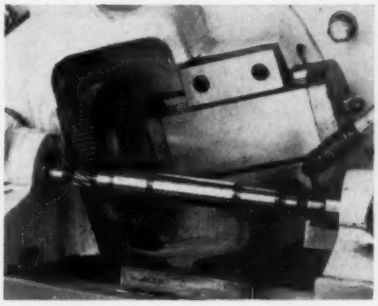
Fellows has long been the leader in Gear Production Equipment, with machines for every gear production job: Fellows Gear Shapers, Pfauter Gear Hobbers, Fellows-Reishauer Gear Grinding Machines, Fellows Gear Shaving Machines and Fellows Inspection Instruments.

If you make gears of any size, from 1/16″ P.D. to 120″ P.D., Fellows' 60 years of experience can help you improve quality and cut costs. For complete information on Fellows Gear Production Equipment, call your nearest Fellows office.

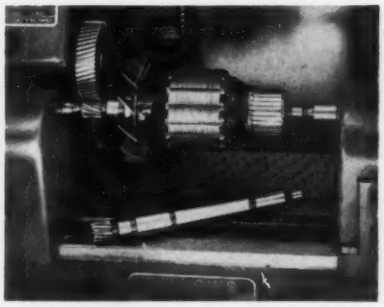
THE FELLOWS GEAR SHAPER COMPANY
78 River Street, Springfield, Vermont
Branch Offices:
1048 N. Woodward Ave., Royal Oak, Mich.
150 West Pleasant Avenue, Maywood, N. J.
5835 West North Avenue, Chicago 39
6214 West Manchester Avenue, Los Angeles 45



SHAPING. The versatile No. 7125 Fellows Gear Shaper gives Stanley high production speeds (up to 450 strokes per minute). It also provides fast, simple changeover from one job to another.



SHAVING. The No. 4 Fellows Fine Pitch Shaving Machine puts finishing touches on each pinion and adds the finish which results in long life and quiet operation.



INSPECTING. The No. 4 Fellows Fine Pitch Red Liner makes and records a composite check of gear accuracy, insuring high quality standards.

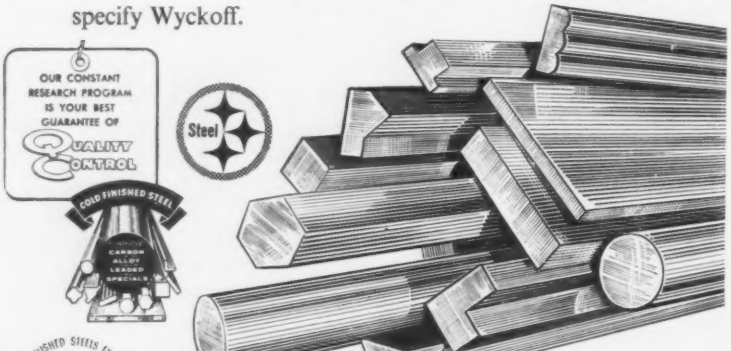
THE PRECISION LINE *Fellows* *Gear Production Equipment*

YOUR LOCAL

STEEL SERVICE CENTER

is a STEEL *Specialist*

with years of experience and know-how in maintaining diversified stocks of all types of cold finished steel bars. He can reduce the cost of your in-plant inventories by making quick deliveries for your production demands. To be sure of the finest cold finished steel bars—always specify Wyckoff.



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WYCKOFF STEEL COMPANY

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Works: Ambridge, Pa. • Chicago, Ill. • Newark, N.J. • Putnam, Conn.

WYCKOFF STEEL PRODUCTS
Carbon, Alloy and Leaded Steels • Turned and Polished Shafting • Turned and Ground Shafting • Large Squares • Wide Flats up to 12¾" x 2¼" and 14" x 1¼" • All types of Furnace Treated Steels including Carbon Corrected Steels

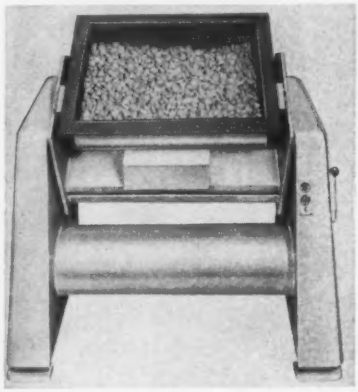
NEW PRODUCTS and equipment

dle is mounted "between" ball bearings to prevent deflection.

For further information, *write* Royal Master Grinders Inc., 272 Highway 23, Riverdale, N. J.

Vibrator for Mixing Doesn't Need Bolting Down

A VIBRATOR (the Stevadoer) can be used for mixing, pulverizing, deburring, descaling, cleaning and screening, grading stones, or for surface refinement of metal parts. All media are vibrated in the tub. Little vibration is transmitted to the base.



Bolting down of equipment is not necessary. The suspension system permits angular positioning of the tub, while maintaining vibration of the media and parts in any position. In the inverted position, it can screen the materials.

For further information, *write* Stevenson Co., Wellsville, Ohio.

Pickle for Cast Aluminum Doesn't Heat Up in Use

A NONFUMING pickle (Kenvert No. 45) can treat either machine or sand cast aluminum. The material is a powder added to 42 degree nitric acid to form a stable operating solution.

When in use, the solution does not heat up or give off brown nitrogen oxide fumes. Long immersion times produce snow-white castings. It can be used after an alkali etch

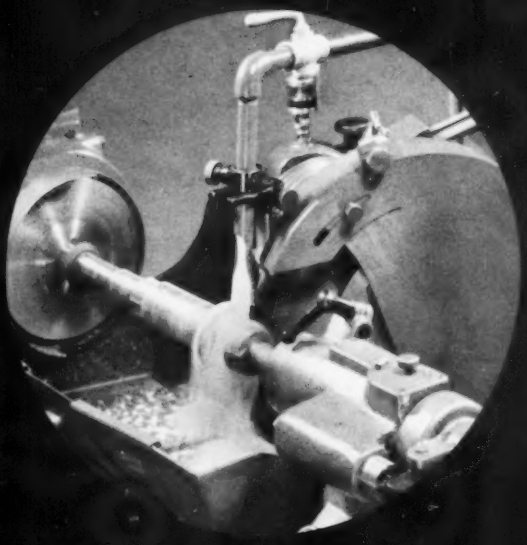
(*Please turn to Page* 167)

This is

Stuart's

new
HI-D
at work

This is what **HI-D** is . . .



A new *transparent* metalworking compound a *petrochemical* compound possessing the high detergency of synthetics but none of their disadvantages. Often described as a hybrid—Hi-D is not truly an emulsion, and not anything like a straight chemical compound. Turn the page to see how this new type of cutting fluid can help you

This is what

Stuart's

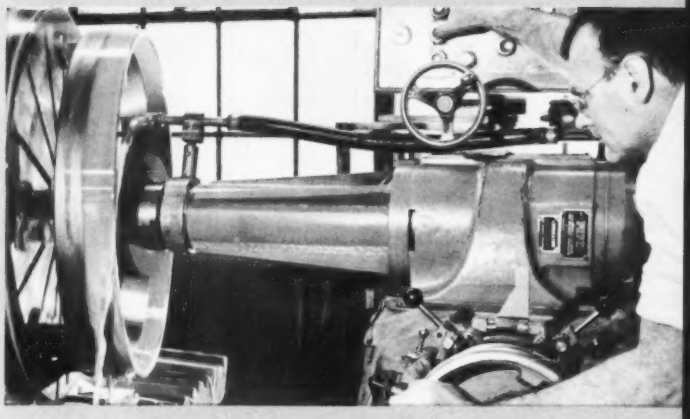
new **HI-D** will do...

Keep grinding wheels open and free-cutting. Permit standardization of wheels—do more different jobs with fewer wheels. Minimize machine tool maintenance. Aid chip formation to produce fine surface finishes. Lubricate efficiently as it cleans. Remain effective and stable at 60:1 for grinding and at 40:1 for cutting—even after picking up tramp oil. Settle chips quickly in an ordinary sump—produce controlled foam in a flotation-type filtering system. Inhibit rust, even at mixtures greater than 60:1.

This is how

Stuart's

new **HI-D** has helped others...



LaSalle Steel Company reduced cutting fluid costs by 45%, using Hi-D for everything from ¼" roughing cuts on lathes to fine finish grinding. At 50:1, Hi-D stops in-plant rust on highly finished steel bar stock.

The Torrington Company, Bantam Bearing Division, saves ⅓ on lubricant costs by using Hi-D at 60:1 on 87 grinders. Hi-D trims *hidden costs,* too, because Torrington dresses wheels only ⅓ as often as before. Think of the savings in wheel and diamond life. Direct costs are slashed on some jobs because both rough- and finish-grinding are done with the same wheel. As for finish, Hi-D eliminates 95% of chip "feedback" from the filtering system.

Stuart's **HI-D** replaces five cutting fluids in diversified plant

Here's how Hi-D's combination of detergency and lubricity slashes lubrication costs for one company on 20 different jobs that range from sawing to surface grinding:

1. **Sawing**—Elimination of chip welding improves blade life. Ability to perform at 10:1 (5:1 formerly required) reduces carry-off and waste.
2. **Turning**—Production is increased by stepping up feed from .030 to .060 ipm. Depth of cut is increased from 3/8" to 1/4".
3. **Mills**—Rancidity is eliminated.
4. **Surface grinding**—Wheel life is increased, downtime is decreased, because petrochemical compound Hi-D keeps wheels open and free-cutting.

On every application, Hi-D matches or betters the performance of five compounds replaced. Cutting fluid inventory and handling costs are reduced. Using Hi-D in the toolroom and cutoff department (serviced by a central system) saves 50 to 60 gallons of cutting fluid per week.

The way to evaluate potential savings in *your* plant is to test Stuart's new Hi-D on a variety of operations. Or, send for free test samples of Hi-D in both concentrate and mixture form that will demonstrate its transparency, lubricity, and stability. Phone your Stuart representative or the factory—BIshop 7-7100.

FREE SAMPLE

Stuart

D. A. STUART OIL CO., LIMITED
2727 South Troy Street, Chicago 23, Illinois

CANADIAN D. A. STUART OIL CO., LTD.
P.O. Box 430, 43 Upton Road, Scarborough, Ontario, Canada

Printed in U.S.A.

NEW PRODUCTS and equipment

(*Concluded from Page* 162)

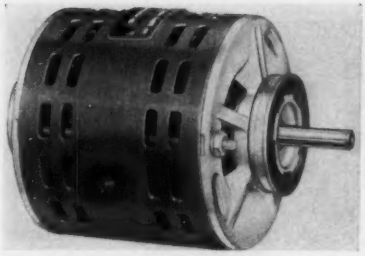
to whiten and selectively remove free silica on the casting surface prior to anodizing, ball burnishing, chromate conversion coatings, and plating operations.

For further information, *write* Conversion Chemical Corp., 98 E. Main St., Rockville, Conn.

Small ac Motors Rated From 1/100 to ⅓ hp

YOU CAN get a line of ac motors in 16 horsepower ratings between 1/100 and 1/3 hp (based on open ventilated operation, 40° C rise, constant speed, and continuous duty at 115 volts, 60 cycles).

Selection can be made from four frame sizes; round body, resilient, or rigid mounting; two, four, and six pole speeds; and capacitor start induction run, split phase, permanent split capacitor, or polyphase design.



Fans used in the double end ventilating system are cast integrally with the rotor. High velocity air is pulled through venturi baffles in the diecast aluminum end heads, directed in a washing action around the coil ends, then exhausted through openings in the motor shell.

For further information, *write* Fractional Horsepower Motor Div., Robbins & Myers Inc., Springfield, Ohio.

Melt Additive Removes Hydrogen, Other Gases

A DEGASSING compound (Logas 50) eliminates gas porosity in copper and copper alloy castings. When the material is inserted into a melt, scavenging gases are released. Dissolved hydrogen and other objectionable gases disappear. The scavenging gases produce no objectionable odors or toxic fumes during the process.

The material comes in seven cylindrical shapes (4 to 32 oz sizes). It's packaged in 24, 48, and 96 lb containers.

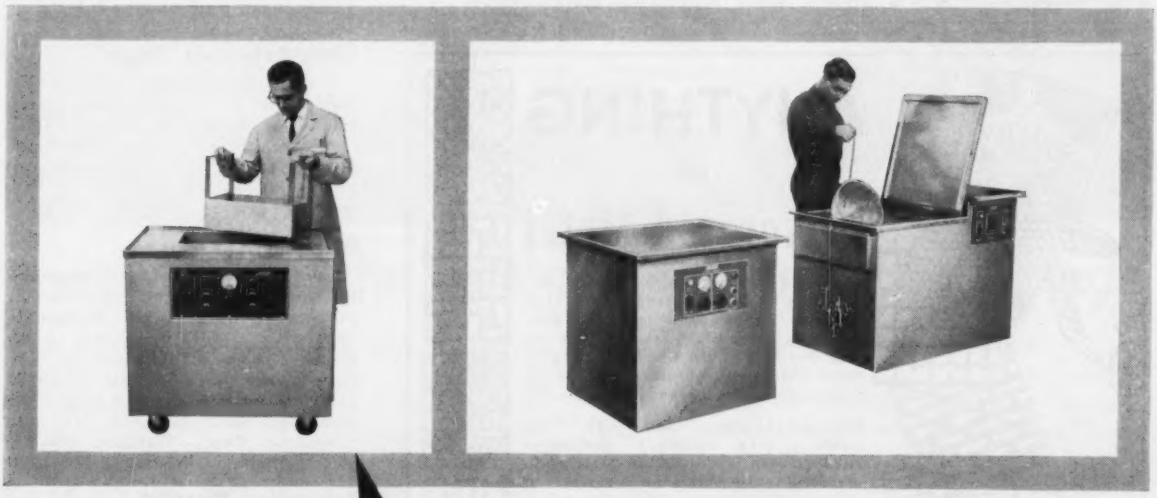
For further information, *write* Foundry Services Inc., P. O. Box 8728, Cleveland 35, Ohio.

Rust Preventive Doubles As Lubricant, Coolant

A RUST and oxidation preventive (Paralan BC) has a special lanolin base.

It displaces moisture and will not clog or damage filtering systems. The preventive volatilizes in annealing furnaces without staining. You can also use Paralan BC as a light stamping and drawing compound, or as a drilling lubricant and coolant.

For further information, *write* American Lanolin Corp., Lawrence, Mass.



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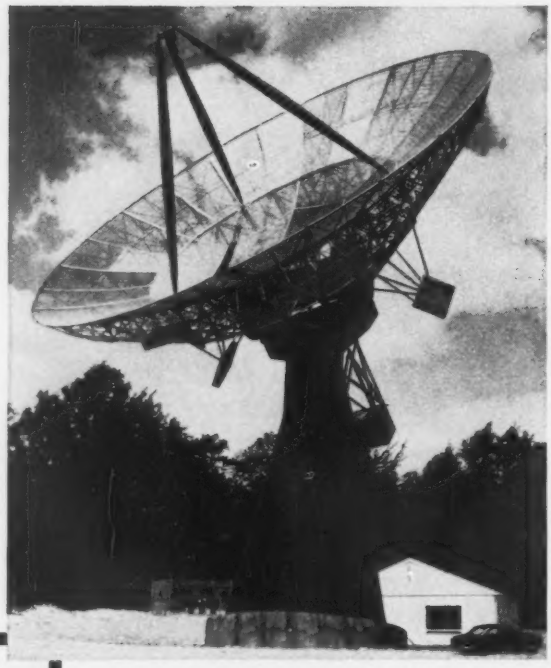

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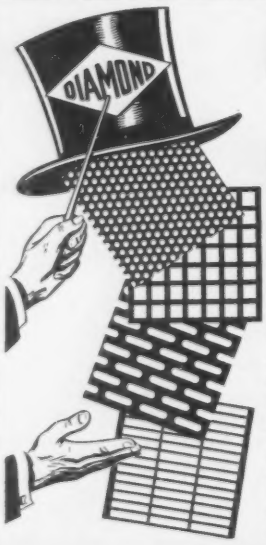

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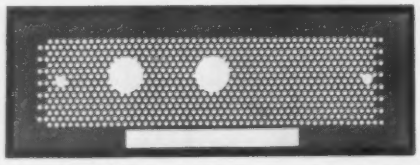

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NEW Literature

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Welding Case Histories

The first quarter, 1960, issue of *Ampco Welding News* discusses overlaying with aluminum bronze weldrod to protect high pressure, extrusion press valves. The issue also describes the repair welding of nickel cast iron feeder pipe and the fabrication of extruded pipe into continuous coils for use in refining potash ore. Ampco Metal Inc., Box 2004, Milwaukee 1, Wis.

Judging Engine Quality

A 28 page handbook discusses the features of various diesel engine designs. Cutaway illustrations compare four and two cycle operation; multiple and single orifice injection valves; precombustion chamber and direct injection of fuels; and other items. Engine Div., Peoria, Ill., Caterpillar Tractor Co.

American Standards Index

The 1960 Price List and Index of American Standards lists nearly 1900 standards that have been approved. Also listed are the international standards recommendations of the International Organization for Standardization and the International Electrotechnical Commission. American Standards Association, 10 E. 40th St., New York 16, N. Y.

Alloy Reference Chart

A chart shows standard data for 55 widely used cast alloys in the carbon, low alloy, and stainless groups. Nickel and Monel are also included. A section covers design applications of each steel alloy. Lebanon Steel Foundry, 156 Lehman St., Lebanon, Pa.

Diamond Abrasives

The technical and economic advantages of finish grinding, honing, and lapping with natural diamonds are discussed in Vol. 1, No. 3 of *Diamond Data*. It describes a diamond ultrafinishing technique for alloys such as Types 440-A, 316, and 304 stainless steel, X-alloy, SAE 52100, and BR-R tool steel. Technical Information Dept., Engelhard Hanovia Inc., 75 Austin St., Newark 2, N. J.

Substation Planning

A work book discusses efficient planning of articulated unit substations for secondary distribution. Ratings, weights, and dimensions are included. A suggested specification form is included. Pennsylvania Transformer Div., Canonsburg, Pa., McGraw-Edison Co.

Pipe and Tubing Data

Alloy Sales Letter 293M contains data on the mechanical properties obtained by normalizing and tempering Babcock & Wilcox Croloys 1¼ and 2¼ at various temperatures. These grades are normally furnished in the fully annealed or equivalent condition. Babcock & Wilcox, Beaver Falls, Pa.

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Market Upturn 60 Days Away

STEEL PRODUCERS see little likelihood of a pickup in demand for their products until late July. Not until then will their biggest customers, the automakers, start ordering in volume for their 1961 models. Business will be lean for the next 60 days because of inventory reductions, vacation shutdowns in many steel consuming industries, and automotive model changeovers.

AUTO SALES SPURT—In the last three weeks, steelmakers have received some unexpected orders from the auto companies, reflecting continued improvement in new car sales. Retail deliveries in the first ten days of May were 8.7 per cent higher than those of early April and 10.3 per cent better than those of May 1-10, 1959. Automakers plan to boost their output by 5 per cent this month (from 546,000 cars to 613,000), and some companies are scheduling additional increases for June.

BONA FIDE BOOM?— Skeptics in the automotive industry claim that there's no real evidence of stronger demand for cars. As they see it, May sales reflect only the frantic efforts of dealers to stimulate business through giveaways and contests. Whatever the truth, this much is known: Dealers still have more than 1 million cars in stock (vs. 834,000 a year ago). They're selling cars at a faster pace than at any time since 1955, but in May of that year they had only 763,000 in stock. Because current inventories are abnormally heavy, there will be a lot of hard selling in June and July.

WISHFUL THINKING— Talk of early introductions should not be taken seriously. Such rumors crop up about this time every year and are almost invariably based on wishful thinking. Look for introductions to begin about Aug. 17, with most of them scheduled for September.

FILL-IN ORDERS— Because of the auto inventory situation, the car companies will not expand their output greatly or buy much new steel before the end of July. They have in stock or on order almost all the metal they'll need to wind up production of the 1960 models. Additional purchases will be strictly of a fill-in nature.

MARKET DRIFTING—The best that can be said for the steel market is that it's no longer deteriorating. Cancellations have fallen back to normal proportions, and incoming orders have leveled off—at a distressingly low plane. Steelmakers are still shipping more tonnage than they're booking. In some product lines (oil country goods, buttweld pipe, stainless), they're booked at less than half of capacity this month. Reason: Users overestimated their needs and are continuing to liquidate surplus stocks. Demand for flat rolled steel is holding up fairly well, but most mills have June openings for cold rolled sheets, galvanized items, and tin plate—products that were almost impossible to get early in the year.

CONSTRUCTION DEMAND LAGS— In the next eight weeks, the market will get most of its support from construction activity. To date, demand from builders, contractors, and structural fabricators has been disappointing. Some mills have noticed an upturn in sales of standard pipe to distributors, but it's regional and can be attributed to better weather.

PRODUCTION SKIDS— Last week, steelmakers continued their efforts to balance production and demand. Operating their furnaces at 71.7 per cent of capacity (2.1 points below the previous week's revised rate), they poured about 2,042,000 ingot tons.

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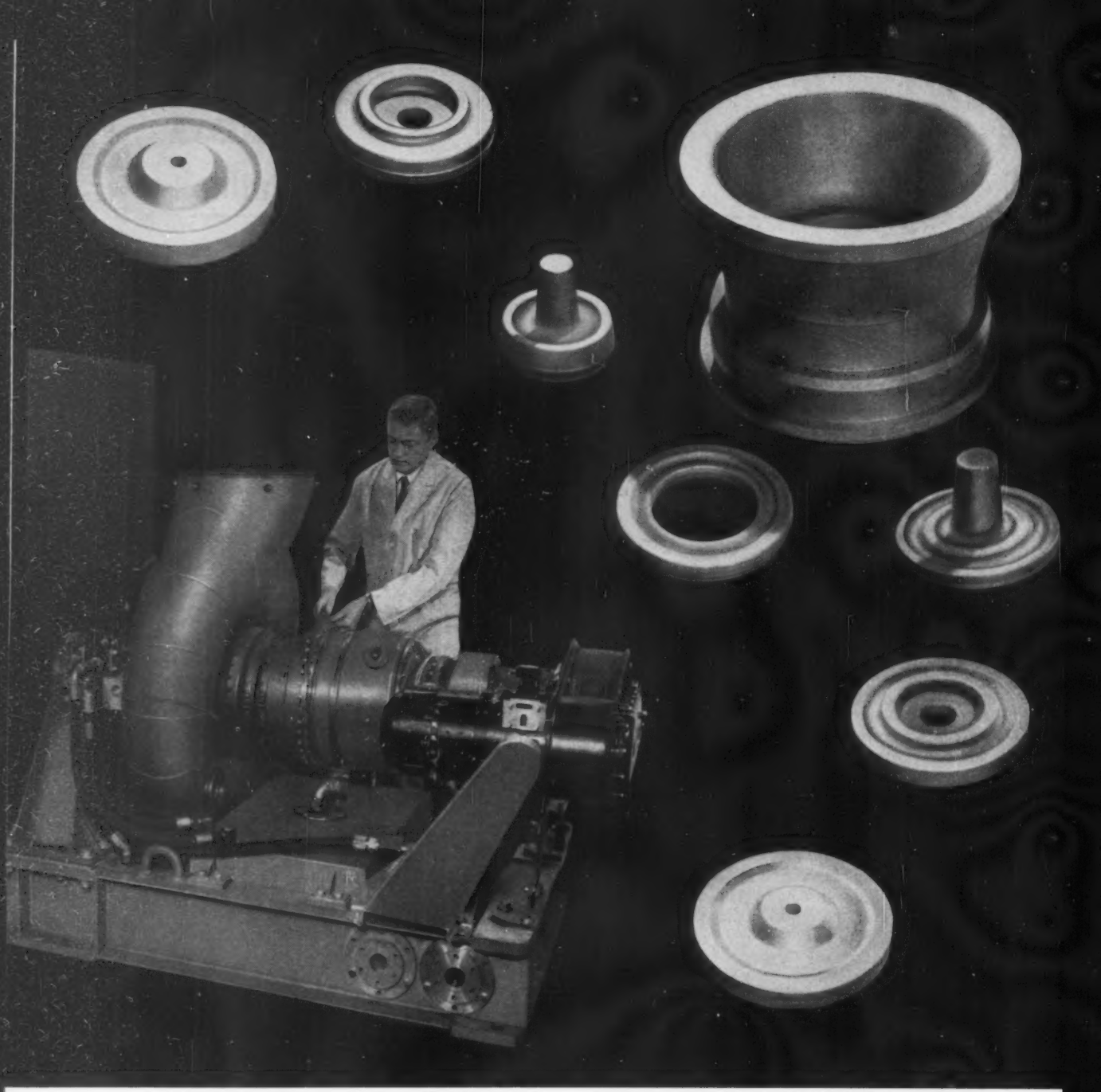
*Current prices were published in the May 16 issue and will appear in subsequent issues.



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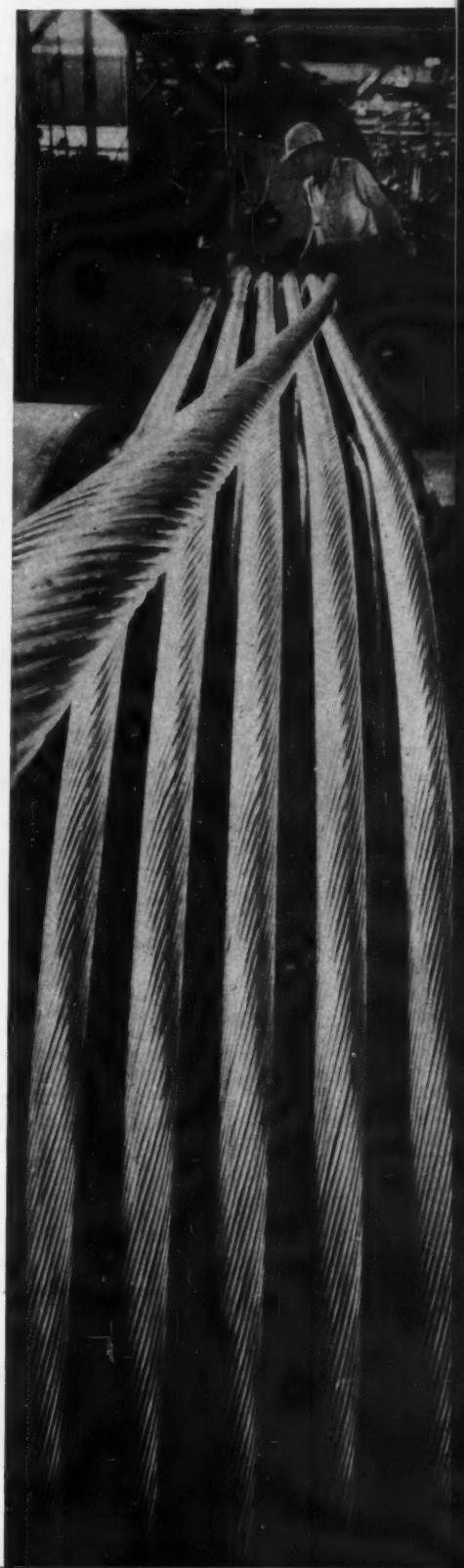
Wire Rope to Hold 1959 Pace

Sales started to perk up at the end of March, but only a few companies surveyed by STEEL expect any gains this year



ALTHOUGH adverse weather in the first quarter hampered construction throughout the country, sales and production of wire rope and cable this year will at least equal 1959 volume. Increases of 8 to 10 per cent are possible.

That's the consensus of leading manufacturers of wire rope and cable, a STEEL market survey discloses. Most of the respondents emphasized the impact of the weather on sales, pointing out that largest order volume is generated by outdoor applications.

• Since the end of March and the return of more favorable weather, an encouraging upturn in business has been reported by many producers of rope and cable.

Wire rope sales last year amounted to about 195,000 tons, up from the 180,000 tons estimated for 1958 but down from 1957's estimated 200,000 tons. A 10 per cent increase over 1959 volume would bring the 1960 total to around 215,000 tons. However, only a minority of the companies surveyed expect such a gain; most of them don't anticipate significant changes from the 1959 showing.

Since wire rope is used in many diversified applications, it's hard to determine the ranking of each area of use. In general, these are the major areas of consumption: Public works (including bridges, highways, dams, and large engineering projects); industrial construction; commercial construction; mining; quarrying; logging; oil and gas well drilling; general industrial applications; equipment manufacturing; elevator installations; military requirements.

• Replacements dominate the market, running 80 to 90 per cent of demand.

Original equipment requirements are largely satisfied by a limited number of ropemakers. The wide disparity between original equipment and replacement needs is understandable in light of wire rope's function as a maintenance item. In some applications, rope may last four or five years, but in others, replacement may be required every few days.

Competition is stiff in the wire rope market. But except in coastal areas, prices have been fairly stable the last 18 months or so. Recently, shading has been developing, and some fear it may become nationwide. They attribute the price cutting to overabundance of capacity. In the main, however, price cutting is charged to imports at prices running as much as 30 per cent below those of domestic products.

• Imports have been cutting into domestic sales steadily—particularly on the West Coast and some areas of the Gulf Coast.

Some people estimate imports account for 10 to 15 per cent of total sales. More than 100 manufacturers in 13 foreign countries export wire rope to this country. Imports have increased from 800 tons in 1949 to 19,600 tons in 1959.

In addition to heavy imports of rope, wire strand is coming into the country in large quantities. Last year, strand imports amounted to 22,226 tons, estimated to equal about 50 per cent of domestic production. Japan has concentrated on stress relieved strand used in prestressed concrete. Last year, 15,000 tons of the more than 22,000 tons imported came from that country.

• American manufacturers are attempting to compete by lowering production costs through increased efficiency.

But cost lowering efforts are limited by high labor rates, which run two to seven times those of foreign producers. Also, the American tax system places the domestic producer at a cost disadvantage in competing

for markets at home and abroad. Domestic makers say the opportunity for increasing exports is slim because they can't match the foreign prices. Until some way is found to equalize costs, one producer points out, there's little prospect for expanding overseas markets without making capital investments abroad in facilities to serve foreign markets.

Makers of wire rope, cable, and strand are seeking to develop products with higher strength and ruggedness. Such efforts will improve the competitive position of producers, but they will not substantially stimulate new demand in the face of rising imports.

One maker points to two market-stimulating developments. 1. Production of rope products of high quality from an improved type of plow steel. 2. A trend toward a more complete line of specialty lifting materials, auxiliary items, and improved service. The producer says a whole new range of synthetic materials is enabling him to provide new types of ropes and slings for diversified uses. Also, the quality, fabricating, and repair of alloy chains and slings have been stepped up. Great strides are also being made in wider adoption of prestressed concrete construction, which means larger demand for wire strand as time passes.

• Practically everything that's heavy and must move requires rope or strand.

For example, a hydraulic elevator in a 50 story building would be extremely expensive. However, hydraulic controls and mechanized handling systems, tractors, and rope conveyors are invading the markets for wire-rope-using equipment. So far, the only major competitive advance is in the lumber country: Tractor loggers have eliminated many of the heavy rope lines that were formerly used in great quantities.

The number of applications where hydraulic force is competing with wire rope is increasing, but rope-makers say the present trend is toward a combination of wire rope and hydraulics, rather than displacement of rope.

Imports of Wire Rope and Strand

ORIGIN	(Net tons) 1959	1958	1957
Canada	956	190	109
Sweden	12	9	97
Norway	154	139	....
United Kingdom	7,399	3,866	2,826
Netherlands	2,855	1,248	1,038
Belgium-Luxembourg	5,146	2,817	2,873
France	360	45	....
West Germany	6,058	6,069	3,384
Italy	1,605	193	....
Other Europe	184	114	283
Japan	17,132	2,219	204
Total	41,861	16,914	10,814

Jet Engine and Missile Steel Prices Are Reduced

Prices were reduced last week on some types of specialty alloy steels used in jet engine and missile production. Producers are seeking to develop civilian applications, such as pressure vessels.

Universal-Cyclops Steel Corp., Bridgeville, Pa., cut prices on high strength, low alloy forging billets about 13 per cent. The steel is used in rocket motor cases and other missiles. The company also said it will meet competition on another group of low alloy steels used in high temperature applications.

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ERIE BOLT & NUT CO.
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Representatives In Principal Cities

Pittsburgh, reduced prices on a group of low alloy steels used in high temperature applications, such as jet engine parts.

Tool Steel . . .

Tool Steel Prices, Page 187

Shipments of tool steel (excluding hollow drill steel) in March totaled 10,362 net tons, reports the American Iron & Steel Institute. In February the movement was 9660 tons. The total for March was the largest for any single month since last June when 12,032 tons were shipped.

The cumulative total for the first three months of the year was 29,619 net tons compared with 24,778 in the like period of 1959. The first quarter this year was the largest for any year since 1956 when 33,096 tons were moved.

Plates . . .

Plate Prices, Page 183

Consumers of sheared and universal plates have no difficulty obtaining shipments within two to four weeks. The situation reflects continued light demands upon the mills from such sources as tank and boiler makers, structural fabricators, shipyards, and railroads.

Inquiry for specialty plates from manufacturers of equipment for the chemical and utility industries is fairly active. Deliveries generally range from six to seven weeks.

Tin Plate . . .

Tin Plate Prices, Page 185

Shipments of tin plate continue to maintain an active pace. Canmakers are busy producing containers for the 1960 food pack. California's canned fruit and vegetable pack this year should about equal last year's.

Tubular Goods . . .

Tubular Goods Prices, Page 187

Demand for pipe, particularly seamless and buttweld pipes, has dropped sharply. There is no indication of an early improvement.

Oilfield operations continue on the disappointing side. Hughes Tool Co. reports for the week ended May 9: 1787 rotary rigs were at work compared with 1809 in the preceding week. For the same period a year ago the count stood at 2138.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 184

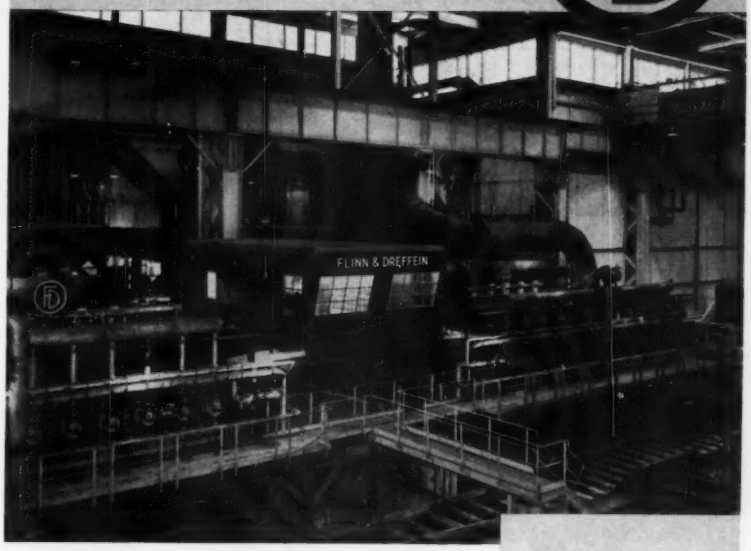
The market for reinforcing steel in the South and Southwest is becoming more stable. Several domestic producers have shaded prices to meet the competition of importers; some are absorbing freight; and some are waiving certain extras. As a result, they are booking a larger portion of new business and discouraging speculators from ordering additional large tonnages from abroad. Material will continue to come in, but at a sharply reduced rate.

In the first two months of this year, reinforcing bar imports totaled 122,699 net tons. Value: $9,010,166. Imports in 1959 amounted to 851,950 tons, up sharply from the 473,018 brought in during 1958.

Atlantic Steel Co., Atlanta, last week posted price reductions of $8.50 a ton on concrete reinforcing bars. Reason: Competitive conditions stemming from heavy imports.

Producers are hopeful that busi-

. . . another first by Flinn & Dreffein . . .



Two new "Flinn & Dreffein Designed" 5-zone reheat furnaces made news recently when they were placed in operation at the new structural mill of United States Steel Corporation's South Works plant at Chicago.

The demand for larger sections, tonnage capacities and flexibility of heating operation dictated this advanced design.

Once again, Flinn and Dreffein experience and know-how reflected by user's confidence inspired Flinn and Dreffein engineers to further the development of reheat furnaces using the latest techniques and materials in furnace design.

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ness will show a marked improvement in the third quarter. Highway and heavy construction, including public works, is expected to reach the year's peak in that period. Road lettings have been less than had been expected this year, largely because of tightened federal and state highway funds.

Steel Bars . . .

Bar Prices, Page 183

Business in hot rolled carbon bars is diversified but is not coming out in sufficient volume to press the mills. Practically all specifications can be had within a month. Cold finished and alloy bars are also readily available.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 184 & 185

Sluggishness dominates the flat rolled steel market. Trading is fairly active only in cold rolled and galvanized sheets, and production in both grades likely will be sustained at a comparatively high level throughout June. Orders are tapering, however, with no appreciable interest in third quarter tonnage.

Some producers say that shipments of hot rolled material will be fairly heavy through June, despite the lack of any substantial buying pressure. Mills are offering deliveries within three to four weeks on hot rolled; five to seven weeks on cold rolled.

The best that can be said for business is that cancellations have tapered. Most of the tonnage remaining on the books appears to be firm.

Automakers responded to better sales reports last week by stepping up production and ordering more steel for 1960 model runs. Tonnages released weren't large. Sales executives in the Pittsburgh area believe many customers are still liquidating inventories. It's the consensus that there won't be a general pickup in flat rolled products for about 60 days.

Last week, Republic Steel Corp. shipped 457 tons of sheet steel to three British automobile companies via the St. Lawrence Seaway. Republic expects to export 6000 tons of sheets to England during 1960.

Distributors . . .

Prices, Page 188

Activity at steel service centers is slackening and is considerably below the March peak. Because of the steel strike and the subsequent rapid replenishment of inventories, first quarter sales were unusually large. Current business seems to be somewhat worse than economic conditions warrant.

First quarter sales reported by one large distributor in the Pittsburgh area were "far superior" to projections; April sales fell about 15 per cent below the average for the first three months.

At another firm, April business declined by "less than 10 per cent." Sales are now stabilized at a lower level, with many users living off their inventories. May shipments are running slightly ahead of last month's, but incoming orders are smaller.

There's little evidence of price cutting, but some of the smaller operators are making concessions, particularly on bars and plates. In some instances, fabricators are liquidating stocks at bargain prices because business hasn't been as good

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as expected and they need cash.

Brokers and dealers of imported steel in the Southwest are flooding the market with low priced material. Despite the competition, distributors report increased business based on the offering of semifinishing services which are not available from brokers.

Effective as of May 6, Joseph T. Ryerson & Son Inc. adopted the Pittsburgh pricing pattern for the Seattle and Spokane districts.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 186

Prices on Standard Pressed Steel Co.'s FN-12 featherweight locknuts have been reduced an average of 15 per cent over the entire size range.

Wire . . .

Wire Prices, Pages 185 & 186

Commercial wire output is running at reduced rates. Shipments are off as much as 25 per cent in most classifications. The pickup in automotive production has not been reflected so far in bookings by that industry. It will take three or four weeks for orders to "filter down" to wire producers since users hold fairly substantial stocks.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 190

Production of coke (oven and beehive) in March totaled 6,375,428 net tons, reports the U. S. Bureau of Mines. Of the total, 6,240,709 tons were oven coke (up 5.6 per cent from the preceding month) and 134,719 tons were beehive (up 6.1 per cent).

In March, 1959, output totaled 6,403,371 tons (6,262,234 oven coke and 141,137 beehive).

Producers' stocks of oven coke at the end of March were 3,671,737 net tons, equal to 18.2 days' production. At the end of March a year ago the total was 3,586,821 tons, equal to 18.7 days' output.

Pig Iron . . .

Pig Iron Prices, Page 188

Merchant pig iron continues to accumulate at the furnaces. Demand is slow and consumers, knowing they can get prompt shipments, are buying on a short term basis.

Blast furnace operators are curtailing their production in line with reduced requirements of users, including steelmakers. Pittsburgh Steel Co. has taken one of the three blast furnaces at Monessen, Pa., out of production.

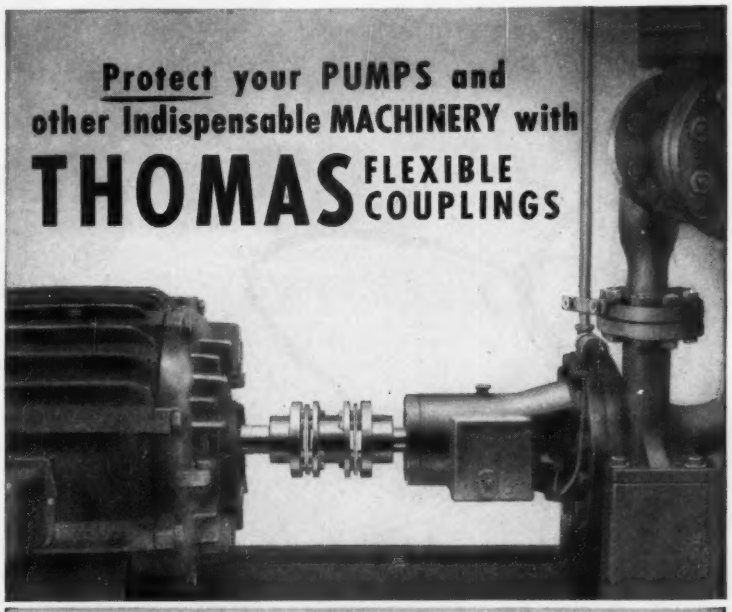
One blast furnace at Swedeland, Pa., is scheduled to go down for an indefinite period while an excess accumulation of stock is worked off.

Hanna Furnace Corp. shut down a blast furnace at Buffalo for repairs, which are expected to require from three to four weeks. Hanna is operating two of its four blast furnaces at that point.

Rails, Cars . . .

Track Material Prices, Page 186

An optimistic note in the general business situation is sounded by Joseph B. Lanterman, president, American Steel Foundries, Chicago. He says that volume and earnings are good for railroad equipment; springs, steel castings, forgings, and machined parts for general industrial use; metalworking lines and



NO LUBRICATION NO MAINTENANCE NO WEARING PARTS

Future maintenance costs and shutdowns are eliminated when you install Thomas Flexible Couplings. These all-metal couplings are open for inspection while running.
They will protect your equipment and extend the life of your machines.
Properly installed and operated within rated conditions, Thomas Flexible Couplings should last a lifetime.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES:

- Freedom from Backlash
- Torsional Rigidity
- Free End Float
- Smooth Continuous Drive with Constant Rotational Velocity
- Visual Inspection While in Operation
- Original Balance for Life
- No Lubrication
- No Wearing Parts
- No Maintenance

Write for Engineering Catalog 51A

THOMAS FLEXIBLE COUPLING COMPANY
WARREN, PENNSYLVANIA, U.S.A.

The "custom" approach to oil seal manufacture, pioneered by IPC, has resulted in some real off beat products.

None-the-less . . . they *work!* They suit the application *and,* in more cases than not, they have contributed substantially to cost savings.

When you're faced with a rugged problem involving oil seals, what synthetic compound comes to mind? How about case design? . . . friction? . . . torque? . . . shaft speeds?

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P-1

precision machinery; roller chains and sprockets; and pipe coating and wrapping.

"Ordering of freight cars during the first six months of the company's fiscal year was not up to expectations," said Mr. Lanterman, "but it is anticipated that more freight cars will be ordered in the next six months."

Cornigliano S.p.a. of Genoa, an Italian steelmaker, has ordered four industrial type diesel-electric locomotives from the General Electric Co. The order is for 65-ton 550 hp units. They will be used to haul raw materials and finished goods into and out of the company's mill over a rail spur connecting it with the Port of Genoa. Shipment of the locomotives will begin late this month.

In 1957, the Cornigliano company, which produces about 13 per cent of Italy's crude steel and more than 40 per cent of the country's rolled steel, ordered three industrial locomotives from G.E.

The U. S. Engineer at Walla Walla, Wash., has called for bids June 2 for relocation of 18.145 miles of Union Pacific Railroad track, a phase of the Ice Harbor power dam project. Unstated quantities of steel will be required.

Structural Shapes . . .

Structural Shape Prices, Page 183

Fabricators are disappointed by the lag in demand from the construction industry. Favorable weather has stimulated activity to some extent but not enough to enable most fabricators to build up backlogs. As a result, price competition is increasingly sharp.

Structural shapes are readily available. Mill shipments of standard and wide flange sections can be had within three to four weeks.

STRUCTURAL SHAPES . . .

REINFORCING BARS PLACED

600 tons, mental hospital, Anchorage, Alaska, to Pacific Coast Div., Bethlehem Steel Co., Seattle.

435 tons, section, Jones Falls Expressway, Baltimore, through Kaufman Construction Co., Philadelphia, to Phoenix Bridge & Iron Works, Phoenixville, Pa.

300 tons, blasting fence installation, Larson Field, Washington state, to Warner Construction Co., Austin, Tex.

140 tons, Broadcast House, Hartford, Conn., through Lewis C. Bowers & Sons, Princeton, N. J., to Keystone Structural Steel Co., Trenton, N. J.

STRUCTURAL STEEL PENDING

3767 tons, tower steel, footings, and extensions, government-furnished, 37.2 mile double circuit Rocky Reach-Maple Valley transmission line, Washington state; bids for erection to Bonneville Power Administration, Portland, Oreg., May 27.

3500 tons, state bypass, Reading, Pa. (Berks County); G. A. & F. C. Wagman, low on general contract. Also required are 900 tons of reinforcing bars, 440 tons of H-piles, 320 tons of welded fabricated wire, and 80 tons of miscellaneous steel.

1000 tons, arresting gear test facility, Navy, Patunxent, Md.; bids June 1.

600 tons, filter and chemical building, Washington; bids June 16.

600 tons (also 360 tons reinforcing bars) Yakima Avenue bridge, Tacoma, Wash.; Woodworth & Co., Tacoma, low at $937,933 for steel; Peter Kiewit Sons Co., Vancouver, Wash., low for prestressed concrete.

500 tons or more, Montana state, 937 ft Yellowstone River dual highway bridge; bids to Helena, May 25.

370 tons, addition, Mercy Hospital, Altoona, Pa.; bids closed.

300 tons (including 100 tons of joists), Police & Firemen's Hospital, Philadelphia; bids June 2.

220 tons (also steel piling and 25 tons of reinforcing), King's River and Sheep Creek bridges, Alaska; bids to Department of Public Works, Juneau, June 1.

185 tons, leg extensions and footings, 16.6 mile Rocky Reach transmission line; Tyee Construction Co., Mercer Island, Wash., low $770,329, to Bonneville Power Administration; materials government-furnished.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1100 tons, library, University of Pennsylvania, Philadelphia, through McCloskey & Co., that city, to Sweets Steel Co., Williamsport, Pa.

138 tons, Washington state highway projects, at Davenport and McCleary, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Lockyear & White and Max J. Kuney Co., general contractors.

REINFORCING BARS PENDING

323 tons, government furnished, footings, etc., 16.6 mile Rocky Reach transmission line, Washington state; Tyee Construction Co., Mercer Island, Wash., low to Bonneville Power Administration, Portland, Oreg.

300 tons (also 60 ton bridge crane), Hills Creek powerhouse, Oregon; Green Construction Co., Seattle, and Tecon Corp., Dallas, joint low $1,191,912, to U. S. Engineer, Portland, Oreg.

185 tons, 212 ft underpass, Payette and Canyon counties, Idaho; bids to Boise, May 31.

100 tons or more, filtration plant, Chehalis, Wash.; R. L. Nartin Co., Oswego, Oreg., low $212,052.

PLATES . . .

PLATES PENDING

400 tons, municipal water storage tank; bids to Ellensburg, Wash., May 25.

385 tons, steel piling for King's River and Sheep Creek highway bridges; bids to Alaska Department of Public Works, Juneau, June 1.

150 tons, 18 in. water supply pipe, Chehalis, Wash.; E. L. Wiggins, Portland, Oreg., low $90,067.

PIPE . . .

CAST IRON PIPE PLACED

343 tons, 12 to 18 in. pipe, Alderwood Manor, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

235 tons, Mountain View district, Anchorage, Alaska, to Pacific States Cast Iron Pipe Co., Seattle.

Special set-up cuts work handling

Combining ingenuity and standard tooling provides a work saving set-up for "big" drilling jobs at Electric Box and Switchboard Company, Chicago. Formerly, 150 to 200 holes in 40 X 72" ebony asbestos and steel switchboard panels were drilled with a conventional drill press, then the work was moved to another location for additional drilling. Now the entire job is completed by one standard Delta Overhead Drill Press. By suspending the drill press from a track 40" long and putting casters on the work table, extra handling and positioning are reduced and special jigs and fixtures eliminated. Set-up permits drilling at any point on a circle 23¾" in diameter.

This is typical of how rugged, versatile Delta Industrial Tools are used throughout industry to supplement or replace costly single purpose machines. For free illustrated booklet of valuable cost-cutting ideas, write: Rockwell Manufacturing Company, Delta Power Tool Division, 638E N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Box 420, Guelph, Ontario.

CAST IRON PIPE PENDING

150 tons, various sizes, Auburn, Ellensburg, Yakima, and King County district, Wash.; bids in.

111 tons, 4 to 10 in. pipe, Rogers Park, Anchorage, Alaska; rebids May 20.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Seaboard Air Line, twenty, 1800 hp diesel electric freight locomotives, ten going to Alco Products Inc., Schenectady, N. Y., and ten to Electro-Motive Div., General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Southern Railways, 200 boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Chesapeake & Ohio, 25 covered hopper cars, to General American Transportation Corp., Chicago.

E. I. du Pont de Nemours, 100 seventy ton covered hoppers, to General American Transportation Corp., Chicago.

Trailer Train Co., 500 eighty-five piggyback flatcars, with 250 going to ACF Industries Inc., New York, 150 to Pullman-Standard Div., Pullman Inc., Chicago, and 100 to Bethlehem Steel Co., Bethlehem, Pa.

Chicago & Eastern Illinois, 33 fifty ton boxcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Great Northern, 20 covered hopper cars, to General American Transportation Corp., Chicago.

Atlantic Coastline, 1000 freight cars, with 300 gondola cars, 200 wet rock cars, and 100 boxcars going to ACF Industries Inc., New York; 200 wood chip cars, to Greenville Steel Car Co., Greenville, Pa.; and 200 hopper cars, to Pullman-Standard Div., Pullman Inc., Chicago.

Atchison, Topeka & Santa Fe, 1800 freight cars, with 500 boxcars, 200 auto boxcars, and 150 flatcars, to own shops at Topeka, Kans.; 500 refrigerator cars, to General American Transportation Corp., Chicago; 300 gondolas, to Magor Car Corp., New York; and 150 seventy ton hopper cars, to Greenville Steel Car Co., Greenville, Pa.

Atchison, Topeka & Santa Fe, 25 baggage cars, to Pullman-Standard Div., Pullman Inc., Chicago.

Baltimore & Ohio, 12 cabooses, to own shops at Washington, Ind.

St. Louis-San Francisco, 100 auto flatcars, to Pullman-Standard Div., Pullman Inc., Chicago.

Great Northern, 20 covered hopper cars, to General American Transportation Co., Chicago.

Chicago, Burlington & Quincy, 150 seventy ton covered hopper cars, to General American Transportation Co., Chicago, and 100 fifty ton boxcars and 30 steel cabooses to own shops at Havelock, Nebr.

Southern Pacific, 100 ninety-five ton, open top hopper cars with aluminum bodies to ACF Industries Inc., New York.

Steel Output Hits Record Despite Slow April

Production of ingots and steel for castings in April totaled 9,771,000 net tons, down from 11,564,683 tons poured in March, reports the American Iron & Steel Institute. But output in the first four months of the year was record-breaking (44,511,893 tons vs. 41,769,988 tons in the like period last year, the previous record).

The institute's index of steelmaking (in terms of the basic index of average production in 1947-49) during April was 141.9 vs. 162.6 in March. The index for the first four months was 160.3 vs. 151.7 in the like 1959 period.

Based on the 1960 capacity rating of 148,570,970 net tons annually, steelmaking operations averaged 80 per cent of capacity during April, against 91.6 per cent in March. The average for the first four months was 90.4 per cent.

Steel Ingot Production—April, 1960

Period	OPEN HEARTH (Net tons)	BESSEMER (Net tons)	OXYGEN PROCESS (Net tons)	ELECTRIC (Net tons)	TOTAL (Net tons)	Percentage of capacity
1960						
January	10,510,616	211,132	280,981	1,046,675	12,049,404	95.5
February	9,715,527	216,263	245,458	949,558	11,126,806	94.3
*March	10,103,122	202,812	306,741	952,008	11,564,683	91.6
*1st Qtr.	30,329,265	630,207	833,180	2,948,241	34,740,893	93.8
†April	8,602,000	105,000	303,000	761,000	9,771,000	80.0
1959						
January	8,280,985	120,005	186,820	729,575	9,317,385	74.3
February	8,541,031	128,515	176,970	756,422	9,602,938	84.8
March	10,216,474	184,892	236,595	929,784	11,567,745	92.3
1st Qtr.	27,038,490	433,412	600,385	2,415,781	30,488,068	83.8
April	9,884,322	195,730	237,018	964,850	11,281,920	93.0
May	10,117,968	200,887	257,325	1,024,401	11,600,581	92.5
June	9,521,053	185,794	259,731	941,056	10,907,634	89.9
2nd Qtr.	29,523,343	582,411	754,074	2,930,307	33,790,135	91.8
1st 6 Mo.	56,561,833	1,015,823	1,354,459	5,346,088	64,278,203	87.8
July	4,541,741	66,433	98,634	525,368	5,232,176	41.7
August	1,171,342	.....	.....	267,935	1,439,277	11.5
September	1,249,398	.....	.....	285,619	1,535,017	12.7
3rd Qtr.	6,962,481	66,433	98,634	1,078,922	8,206,470	22.1
9 Mo.	63,524,314	1,082,256	1,453,093	6,425,010	72,484,673	65.6
October	1,385,490	.....	.....	319,043	1,704,533	13.6
November	6,290,659	92,361	129,794	754,793	7,267,607	59.9
December	10,468,534	205,666	281,451	1,033,668	11,989,319	95.6
4th Qtr.	18,144,683	298,027	411,245	2,107,504	20,961,459	56.3
2nd 6 Mo.	25,107,164	364,460	509,879	3,186,426	29,167,929	39.2
Totals	81,668,997	1,380,283	1,864,338	8,532,514	93,446,132	63.3

Note—The percentages are based on annual capacities as of Jan. 1, 1960: Open hearth, 126,621,630 net tons; bessemer, 3,396,000 net tons; basic oxygen process, 4,157,400 net tons; electric and crucible, 14,395,940 net tons. Total: 148,570,970 net tons. In 1959, the capacity tonnages were: Open hearth, 126,528,380 net tons; bessemer, 3,577,000 net tons; basic oxygen process, 4,033,160 net tons; electric and crucible, 13,495,130 net tons. Total: 147,633,670 net tons.
†Preliminary. *Revised.

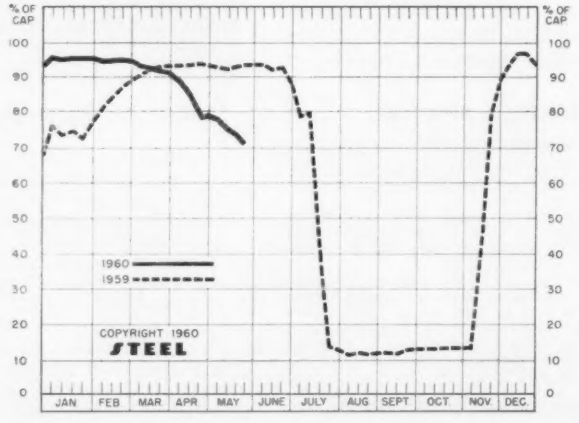
DISTRICT INGOT RATES

(Percentage of capacity utilized)

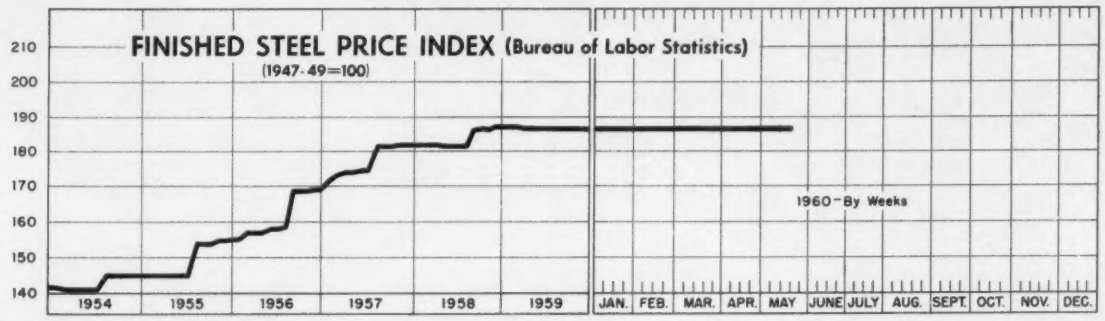
	Week Ended May 22	Week Ago	Month Ago	Year Ago
Northeastern	75	77	79	92
Buffalo	76	77	84	101
Pittsburgh	72	75	79	94
Youngstown	45	50	63	86
Cleveland	79	78	87	94
Detroit	95	99	83	99
Chicago	73	76	84	93
Cincinnati	81	88	92	86
St. Louis	85	80	84	102
Southern	72	73	79	93
Western	70	70	70	98
Total Industry	71.7	73.8	78.5	93.4
Index (1947-49 = 100)	127.1	130.9	139.3	164.6
Net Tons (In thousands)	2,042	2,102	2,238	2,644

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



May 17, 1960	Week Ago	Month Ago	Apr. Index	Year Ago
186.8	186.8	186.8	186.8	186.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended May 17

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.675	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.595	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.825
		Wire, Barbed (80-rod spool)	8.766
		Woven Wire Fence (20-rod roll)	21.880

STEEL's FINISHED PRICE INDEX*

	May 18 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$118.45
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	33.33	33.33	33.67	33.33	34.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	May 18 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton

	May 18 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

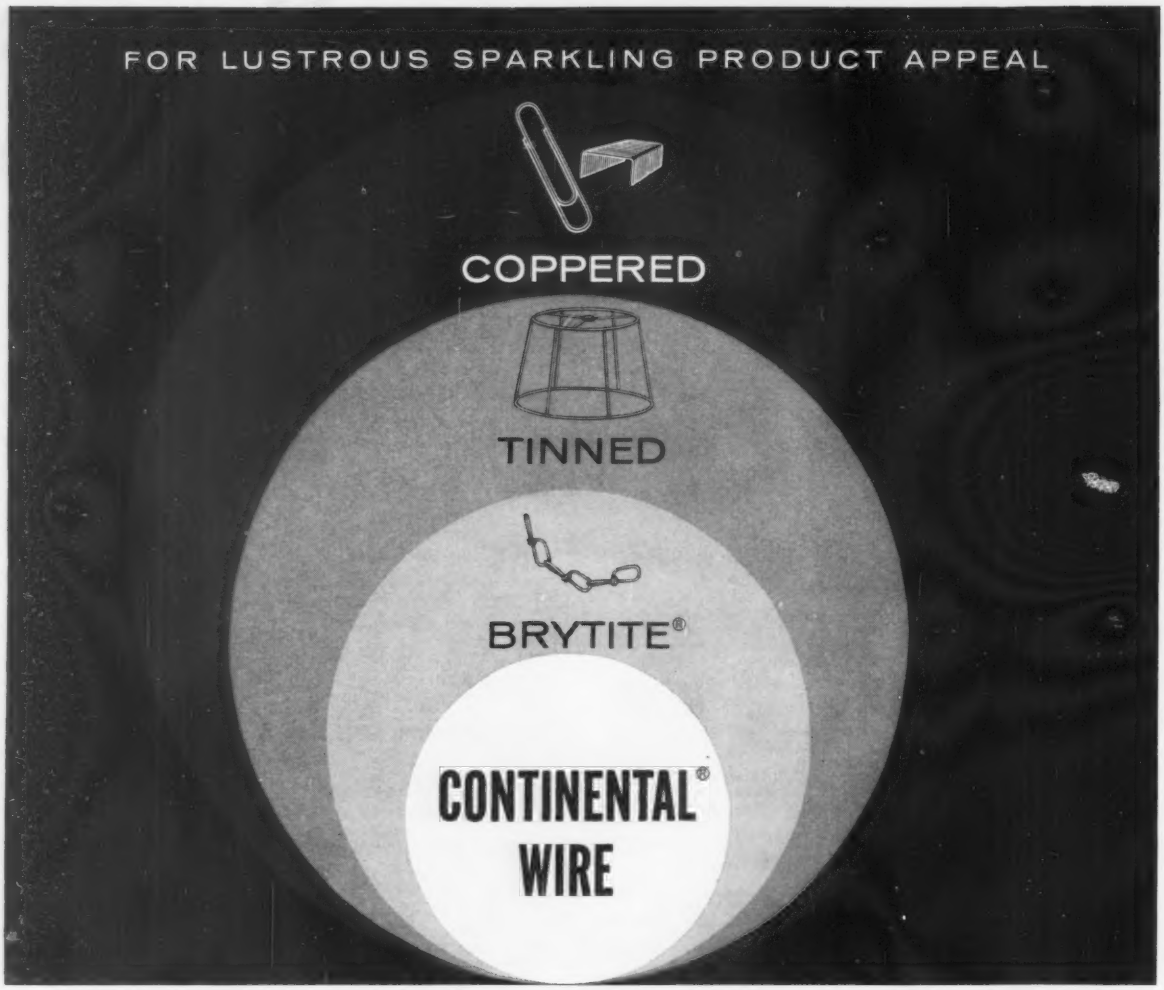
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$33.50	$33.50	$34.50	$34.50	$34.50
No. 1 Heavy Melt, E. Pa.	35.00	35.00	35.00	33.50	36.00
No. 1 Heavy Melt, Chicago	31.50	31.50	31.50	32.00	34.00
No. 1 Heavy Melt, Valley	34.50	35.50	36.50	35.50	34.50
No. 1 Heavy Melt, Cleve.	31.50	32.50	33.50	33.50	31.50
No. 1 Heavy Melt, Buffalo	30.50	30.50	30.50	31.50	30.50
Rails, Rerolling, Chicago	52.50	52.50	53.50	55.50	51.50
No. 1 Cast, Chicago	42.50	42.50	45.50	47.50	40.50

COKE, Net Ton

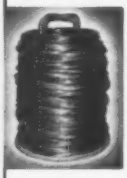
Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25



...in special coatings for long lasting fine appearance

MODERN WIRE PACKAGING FOR SPEEDING PRODUCTION

ECONO-COIL®



The single length catch-weight coil that reduces scrap loss and down time in wire fabrication. Continuous length 1500# to 2500#, depending on finish and gage, reduces coil changes, cuts waste.

LEVERPAK or PAYOFFPAK

Modern drum containers protect wire against moisture, dirt; keep wire clean and safe. Handles 500# to 650# catch-weight single length coils, for sizes 14 ga. through 24 gauge. Other sizes on application.

One of these three special finishes may be just the thing to give your product added good looks and high quality appeal. Coppered: Extra smooth finish, for bucket bails, and many items like bag ties, card holders, baggage hooks. Tinned: Unusual brightness and luster, where appearance is important, as in lamp shade frames. Brytite®: Zinc coated wire with the plated look, takes hard turns and twists without flaking or powdering, for chains, display racks, bottle carriers, etc.

Smoothness of surface, lasting luster and uniform workability are hallmarks of Continental Wire, as proved in countless applications. Other finishes, in addition to those above are available, in various tempers and analyses, in low and medium low carbon steel. Your product's sales appeal may depend on Wire-Appeal! Write today for our wire manual.

fine finishes in manufacturers' wire

CONTINENTAL STEEL

CORPORATION **KOKOMO, INDIANA**

PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, BRYTITE, Annealed, Liquor-Finished, Bright and Special Shaped Wire. Also Reinforcing and Galvanized Fabric, Nails, Continental Chain Link Fence, and other products.

Steel Prices

Mill prices as reported to STEEL, May 18, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 184, footnotes, page 186.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 .....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3..104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 .....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 .....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ...119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 .....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ....119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ..119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5....122.50
Warren,O. C17.....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Benwood,W.Va. W10....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 .....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 .....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 .....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14..5.50
S.SanFranciscoB3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H. S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1 8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ...8.10
LosAngeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ...8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ....5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ....6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer, Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif(30) K1....6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 .....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14...5.30
SparrowsPoint,Md. B2...5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 .....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ...7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1...8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y-1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2...7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2...7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3...6.375
Ind.Harbor,Ind. I-2 ....6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10...5.55
Ashland l.c.l. (15) A10..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa. (9) J5...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5..5.925
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18...6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11 .6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ....5.675
Seattle(9) A24,B3,N15..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11..6.375
Warren,O. C17 .....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2...6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ...8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 .....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. (9) B2..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco B7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (including leaded extra) Carbon
LosAngeles P2, S30....11.75*

Alloy
Ambridge,Pa. W18....10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12, R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles (49) S30....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ...8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4...7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32...9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8...9.625
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025

Waukegan,Ill. A7 ....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2...5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ...6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ....5.675
Sterling,Ill. N15 .....5.775
Struthers O. Y1 .....5.675
Tonawanda,N. Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N. Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ....7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 .19.80
McK.Rks.(S.R.) L5 ....14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 .....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill. G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875†
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 .....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 .....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapmann&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.
U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.
V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.
W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ...5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1..5.10
Johnstown,Pa.(25) B2 ..5.10
Lackaw'na,N.Y.(25) B2.5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. W14 ....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport,Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 .....7.575
Bessemer,Ala. T2 .....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 .....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2, Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 .8.325
SparrowsPoint,Md. B2 .7.575
Warren O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ..7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ....5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. W10 .7.425
Fontana,Calif. K1 .....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles C1, S41 ....9.30
McKeesport,Pa. E10 ..7.525
NewBedford,Mass. R10.7.875
NewBritain Conn. S15..7.875
NewCastle,Pa. B4, E5..7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6.7.425
Pawtucket,R.I. R3, N8.7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton N.J.(31) R5 ..8.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville,O. S3 .....15.55
Pawtucket R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. S3 ....10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80
Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	0.80C	1.05C	1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ..7.50*
Riverdale,Ill. A1 .....7.525*
Warren,O. B9, S3, T5.7.425*
Worcester Mass. A7 ...7.975
Youngstown S41, Y1..7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 .....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irwin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)

Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
Indiana Harbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary Ind. U5	8.20
GraniteCity G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed 1/2c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vantergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed 1/2c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed, †Fully processed only. ‡Coils, annealed; semiprocessed 1/2c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquippa,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. M8..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ....8.35
Johnstown,Pa. B2 .....8.00
Joliet,Ill. A7 .....8.00
KansasCity,Mo. S5 .....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2 .8.10
Sterling,Ill. (1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
KansasCity,Mo. U3 ....12.90
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P7, P16..12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer Mass. W12 .....13.70
Pittsburg,Calif. C11 ..13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ..13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
Kokomo,Ind. C16 .....9.85
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ..10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7, J4, T6 10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville,Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury,Mass(12) N6..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16..9.75
Muncie, Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ....10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Wor'ster,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....16.50
Bartonville,Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8.16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.55
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 ....16.30
KansasCity,Mo. S5 ....16.55
Kokomo,Ind. C16 ....16.30
Minnequa,Colo. C16 ....16.55
Monessen,Pa. P16 ....16.30
Muncie,Ind. I-7 .....16 50
Palmer,Mass. W12 ....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 ....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE	(A)
Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St. Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes — Col.

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES — Col.

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop — Col.

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS — Col.

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed — Col.

AlabamaCity,Ala. R2	.193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga. — Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone	An'ld Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	..17.85	19.65
Bartonville K4	..17.95	19.80
Cleveland A7	....17.85	....
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	..18.35	19.90†
Houston S5	....18.10	19.65**
Jacksonville M8	18.95	19.80‡‡
Johnstown B2	..17.85	19.65§
Kan.City,Mo. S5	..18.10	....
Kokomo C16	....17.95	19.50†
Minnequa C10	..18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	..17.95	19.80
SparrowsPt. B2	..17.95	19.75§
Waukegan A7	..17.85	19.40†
Worcester A7	...18.15	....

Wire, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	..9.00	9.55**
Aliquippa J5	....8.65	9.325§
Atlanta(48)A11	..9.10	9.775§
Bartonville(48) K4	9.85	19.90
Buffalo W12	....9.00	9.55†
Cleveland A7	....9.00	....
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	...9.00	9.55†
Duluth A7	....9.00	9.55†
Fairfield T2	....9.00	9.55†
Houston(48) S5	..9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	....9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	..9.10	9.65†
LosAngeles B3	..9.95	10.625§
Minnequa C10	...9.25	9.80**
Monessen(48) P7	..8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	..9.95	10.50†
Rankin,Pa. A7	...9.00	9.55†
S.Chicago R2	....9.00	9.55**
S.SanFran. C10	..9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	..9.10	9.80
Struthers,O. Y1	..9.00	9.65†
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS, Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

7/8 in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Rails				
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa. deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa., S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.53	8.66	10.06	....	10.94	9.33	11.80	16.38	9.92	9.15	10.50
Birmingham	9.43	10.20	10.46	....	10.41	9.09	13.14	16.76	9.00	9.29	10.90
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.50	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	10.81	11.22	11.34	....	12.29	10.97	12.68	....	11.38	11.17	12.18
Chicago	8.74	10.20	10.95	53.00	10.40	8.84	10.65	15.95	9.33	8.67	10.46
Cincinnati	8.91	10.26	11.00	53.43	10.72	9.16	11.53	16.27	9.89	9.05	10.79
Cleveland	8.73	9.88	11.14	52.33	10.51	8.96	11.25	16.06	9.75	8.92	10.56
Dallas	9.62	10.43	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.02
Detroit	9.00	10.46	11.30	56.50	10.77	9.15	11.01	16.23	9.89	9.04	10.72
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	10.03	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.62
Indianapolis	9.18	10.64	11.39	....	10.84	9.28	11.09	16.39	9.77	9.11	10.90
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	57.60	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Milwaukee	8.88	10.34	11.09	....	10.54	8.98	10.89	16.09	9.55	8.81	10.60
New York	9.36	10.13	11.35	53.08	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	9.10	10.00	10.89	52.17	11.10	9.50	11.95	16.38	9.85	9.55	10.55
Pittsburgh	8.73	9.88	11.03	52.33	10.49	8.85	11.25	15.95	9.36	8.68	10.32
St. Louis	8.84	10.58	11.33	....	10.50	8.95	11.28	16.33	9.45	8.78	10.57
St. Paul	9.00	9.59	10.74	....	10.66	9.12	11.49	16.54	9.63	8.95	10.49
San Francisco	10.17	11.69	11.45	55.10	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.07	11.44	12.05	56.52	11.84	9.96	16.20	17.80	10.59	10.17	12.46
Spokane, Wash.	9.97	11.34	11.95	57.38	11.74	9.86	16.20	17.80	10.49	10.07	12.36

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. x 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, ¾ in.—2⅛ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅝ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, ¼ in. x 84 in.; floor plates, ⅜ in. x 36 in.

How to produce more hot metal in a hurry:

Win the race to boost hot iron production without the delay or expense of physical plant expansion. Island Creek engineers are ready to show you how Island Creek Precisioneered Coking Coals are currently helping increase production significantly in a number of leading mills... while actually lowering the net cost per ton of hot metal. You owe it to yourself to see the proof.

It is no longer just a theory. With the right coking coal, you can help increase hot metal production from existing coke ovens and blast furnaces. It's being done. Right now. Island Creek Coking Coals, from inherently better metallurgical seams, have a lower ash, sulphur and moisture content. Result: improved coke yield and throughput and a stronger coke, with more effective carbon. You use less coke, therefore, per ton of iron, save more furnace space for producing hot metal. And while you're getting this increased production, you're getting lower net costs. Island Creek has the tools (including a modern carbonization laboratory with test oven of full commercial width) to evaluate coking characteristics of coal blends and predict, in advance, results you'll be able to prove in a test run. Phone or write. No obligation.

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An Island Creek Precisioneered Coal may help you lower your cost per 1000 pounds of steam.

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Precisioneered Coking Coals

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Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo. $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70*Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gidsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ⅛ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, Concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian, 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo contents, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron, Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in. (In contract lots of 750 tons price is 22.75c)	28.75
Annealed, 99.5% Fe. ton, del. east of Mississippi.	36.75.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 98.1-98.9%, 2 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l.	38.50; ton lots 40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	35.10-52.20†
Bronze, 500-lb lots	53.10-56.70†
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.70-69.00†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	46.50-64.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Chromium electrolytic 99.8% Cr, min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.60	9.65	9.50	9.40	9.75
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.40	6.30	6.25	6.60
Wire Rods, O. H., No. 5	6.75	6.75	6.65	6.60	6.95
Bright Common Wire Nails (§)	8.50	7.40	7.40	7.25	7.65

†Per 82 lb net reel. §Per 100-lb keg. 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

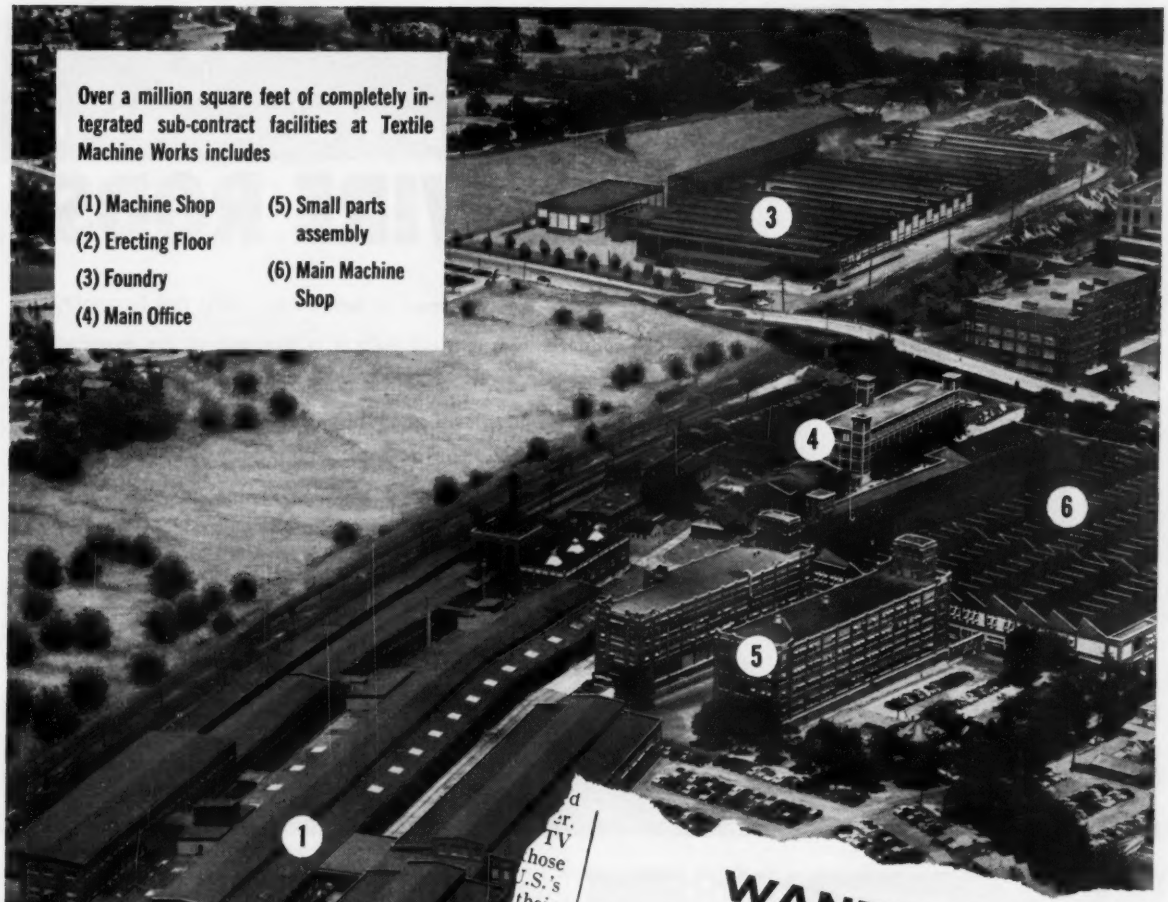
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant.

Ammonium sulfate, regular grade	$32.00



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Production machining on a job or long-term basis; contracts for precision components, assemblies and complete machine building.

QUALIFICATIONS: 65 years' experience in precision (tolerance to 10ths) manufacturing, 1200 modern machine tools, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen including a corps of industry's top designers and engineers.

REFERENCES: The best . . . companies like Alcoa, Du Pont, Chrysler, Eastman Kodak, Western Electric, Fairchild Aircraft, Ingersoll-Rand and others who know they can depend on TMW for quality, accuracy and on-time delivery at minimum costs.

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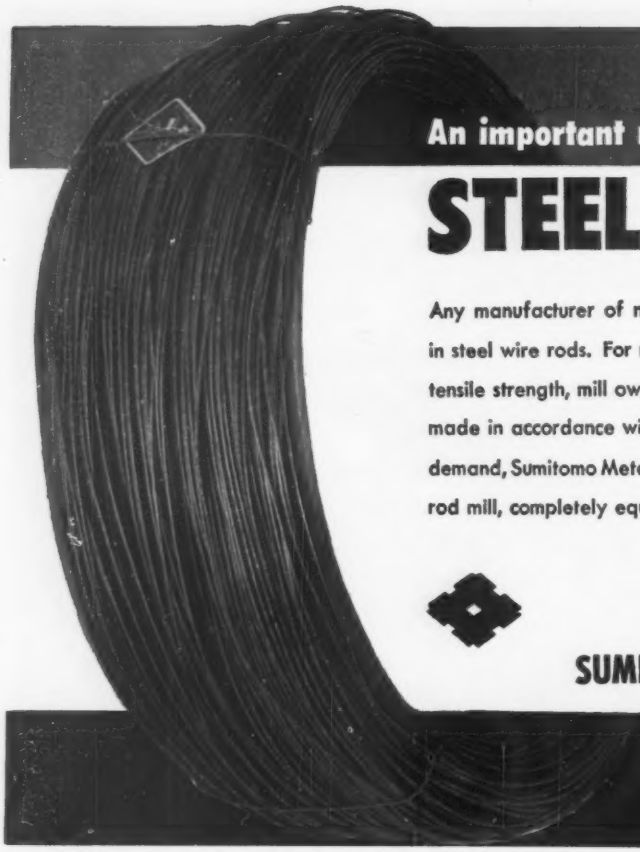

An important message for the man who buys

STEEL WIRE RODS

Any manufacturer of nail, wire mesh or barbed wire looks first for quality in steel wire rods. For rods that are uniform in size and of the specified tensile strength, mill owners have learned to rely on Sumitomo's wire rods, made in accordance with strictest standards. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

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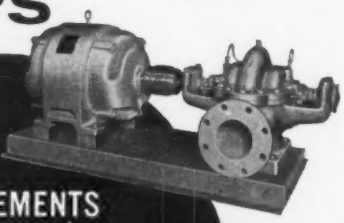

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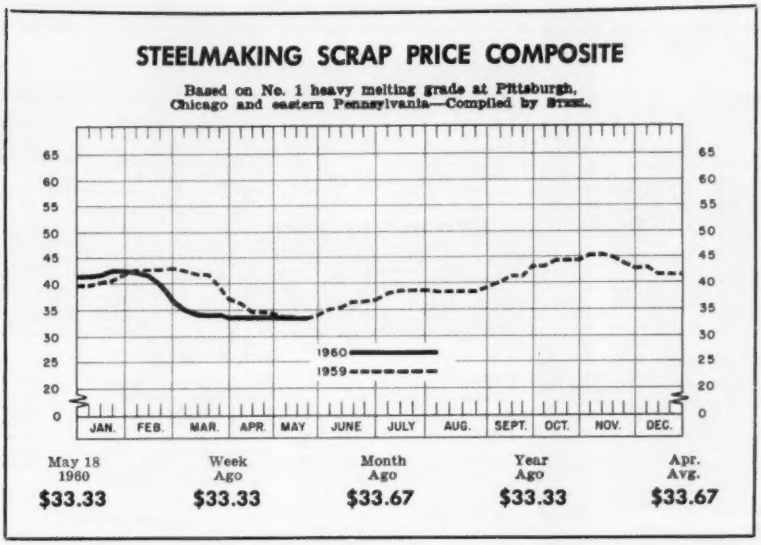


Scrap Prices Hold in Dull Market

STEEL's composite on No. 1 heavy melting steel remains at $33.33 for third consecutive week. Demand from domestic mills is light; from exporters, fairly active

Scrap Prices, Page 194

• **Pittsburgh** — Buying activity remains negligible, with prices unchanged. One consumer who purchases small lots almost every week is now taking less tonnage. Reason: Blast furnace repairs have been completed, permitting the company to use its full hot metal capacity for the first time in several months. Trade sources believe No. 2 bundles have hit their low point for the year. With consumers paying only $26 a ton, there's hardly any margin for the seller, who must collect, process, and ship them.

• **Philadelphia**—Scrap prices remain unchanged except for further nominal declines in mixed borings and turnings and machine shop turnings to $17, delivered, and in shovel turnings to $21. Malleable is also on the nominal list but unchanged at $55 to $56.

Brisk export trading continues in the open hearth grades, but domestic inquiry continues dull.

• **New York**—Scrap brokers' buying prices are unchanged, except for a $5 drop in 18-8 borings and turnings to a range of $85 to $90. Active export demand for open hearth scrap continues. Little inquiry is being received from domestic sources.

• **Chicago** — Despite limited trading, scrap prices are unchanged. Because of the falling steel rate, brokers are not optimistic and feel that prices may decline a dollar or two soon.

• **Detroit**—No orders, few inquiries, and the usual pessimism summarize the scrap market here. Prices are unchanged, but the feeling is that auto lists may go lower if mills continue to lower steelmaking operations and if there's little export demand for production scrap.

• **Youngstown**—The tone of the scrap market is weaker. Prices are nominally lower: No. 1 heavy melting is $34 to $35, with bundles $1 under that; No. 2 heavy melting is $26.50; and No. 2 bundles about $22.

• **Buffalo**—The mill price for No. 2 heavy melting steel has declined another dollar a ton to $26 as a result of a new purchase by a leading consumer. The mill paid the prevailing price of $23 a ton for No. 2 bundles.

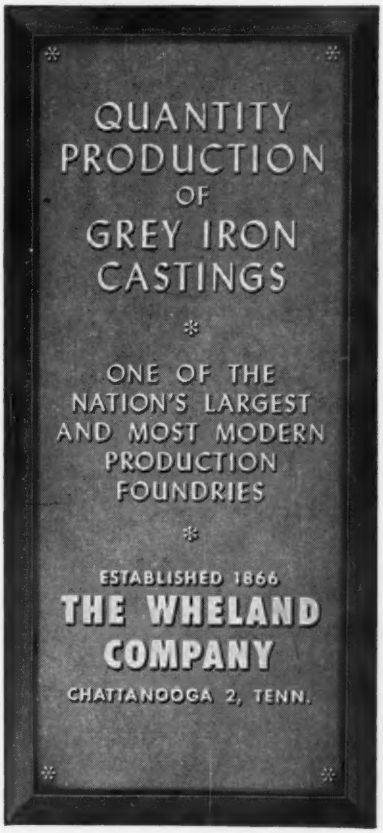
The price of No. 1 heavy melting scrap has been reaffirmed at the $31 level, reflecting a relatively better price tone in this grade as compared with the secondary grades which have been declining. Top specialty grades continue to hold the price line here, including railroad scrap and low phos.

• **Cincinnati**—Market undertone is weak. Pricing on steelmaking grades is tending toward the nominal side as the market comes to a standstill. The small tonnage orders placed by area mills are largely completed. Traders see little hope of June pickup.

• **St. Louis**—Scrap business here is the worst it has been in several years. Prices quoted on open hearth grades are nominal. Local mills, including Kansas City's, are closed out of the market.

Cast iron and rail scrap business is also down, though there have been few transactions on which to base railroad scrap prices. When trading resumes, prices are expected to drop farther from present nominal levels.

(*Please turn to Page* 199)



Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, May 18, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 18	$33.33
May 11	33.33
Apr. Avg.	33.67
May 1959	33.58
May 1955	34.87

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	25.00-26.00
No. 1 busheling	33.00-34.00
No. 1 factory bundles	39.00-40.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut structurals:	
2 ft and under	41.00-42.00
3 ft and under	40.00-41.00
Heavy turnings	30.00-31.00
Punchings & plate scrap	44.00-45.00
Electric furnace bundles	40.00-41.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	44.00-45.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Random rails	51.00-52.00
Angles, splice bars	45.00-46.00
Railroad specialties	47.00-48.00
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	200.00-205.00†
18-8 turnings	100.00-105.00†
430 bundles & solids	100.00-105.00†
430 turnings	50.00-55.00†

CHICAGO

No. 1 hvy melt., indus.	32.00-33.00
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	27.00-28.00
No. 1 factory bundles	36.00-37.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	20.00-21.00
No. 1 busheling, indus.	32.00-33.00
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	37.00-38.00
Punchings & plate scrap	38.00-39.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	37.00-38.00
Unstripped motor blocks	35.00-36.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
R.R. malleable	48.00-49.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Angles, splice bars	43.00-44.00
Axles	51.00-52.00
Rails, rerolling	52.00-53.00

Stainless Steel Scrap

18-8 bundles, solids	195.00-200.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	15.00-16.00
No. 1 bundles	29.00-30.00
No. 2 bundles	13.50-14.50
No. 1 busheling	26.00-27.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	9.00-10.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	32.00-33.00
Heavy breakable	32.00-33.00
Unstripped motor blocks	24.00-25.00
Charging box cast	32.00-33.00
Clean auto cast	45.00-46.00

CLEVELAND

No. 1 heavy melting	*31.00-32.00*
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	36.00-37.00
No. 1 bundles	*31.00-32.00*
No. 2 bundles	19.00-20.00
No. 1 busheling	32.00-33.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	35.00-36.00
Cut structurals, plate 2 ft and under	43.00-44.00
Low phos. punchings & plate	34.00-35.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Charging box cast	33.00-34.00
Heavy breakable cast	35.00-36.00
Stove plate	44.00-45.00
Unstripped motor blocks	35.00-36.00
Brake shoes	35.00-36.00
Clean auto cast	52.00-53.00
Burnt cast	42.00-43.00
Drop broken machinery	54.00-55.00

Railroad Scrap

R.R. malleable	49.00-50.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	49.00-50.00
Cast steel	42.00-43.00
No. 1 railroad cast	52.00-53.00
Railroad specialties	45.00-46.00
Angles, splice bars	45.00-46.00
Rails, rerolling	60.00-61.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	195.00-200.00
18-8 turnings	95.00-100.00
430 clips, bundles, solids	100.00-105.00
430 turnings	30.00-40.00

YOUNGSTOWN

No. 1 heavy melting	*34.00-35.00*
No. 2 heavy melting	26.00-27.00
No. 1 busheling	35.00-36.00
No. 1 bundles	*34.00-35.00*
No. 2 bundles	22.00-23.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	37.00-38.00
Electric furnace bundles	36.00-37.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.50-36.50

BUFFALO

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	*25.00-26.00*
No. 1 bundles	30.00-31.00
No. 2 bundles	22.00-23.00
No. 1 busheling	30.00-31.00
Shovel turnings	19.00-20.00
Machine shop turnings	14.00-15.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	41.00-42.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00-43.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	44.00-45.00
Rails, 3 ft and under	50.00-51.00
Railroad specialties	41.00-42.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.50-30.50
No. 2 heavy melting	24.50-25.50
No. 1 bundles	29.50-30.50
No. 2 bundles	19.50-20.50
No. 1 busheling	29.50-30.50
Machine shop turnings	12.00-13.00
Mixed borings, turnings	12.00-13.00
Shovel turnings	15.00-16.00
Cast iron borings	14.00-15.00
Low phos. 18 in.	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable cast	35.00-36.00
Charging box cast	37.00-38.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	*33.00-34.00*
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	47.00-48.00

PHILADELPHIA

No. 1 heavy melting	35.00
No. 2 heavy melting	31.00
No. 1 bundles	37.00
No. 2 bundles	22.00
No. 1 busheling	37.00
Electric furnace bundles	38.00
Mixed borings, turnings	*17.00†*
Shovel turnings	*21.00†*
Machine shop turnings	*17.00†*
Heavy turnings	29.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	44.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	43.00
Drop broken machinery	51.00-52.00
Malleable	55.00-56.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	34.00-35.00

Stainless Steel

18-8 sheets, clips, solids	180.00-185.00
18-8 borings, turnings	*85.00-90.00*
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 1 busheling	26.00-27.00
Machine shop turnings	6.00-7.00
Shovel turnings	11.00-12.00
No. 1 cast	39.00-40.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	*24.00-25.00*
No. 1 bundles	30.00-31.00
No. 2 bundles	20.00-21.00
No. 1 busheling	35.00-36.00
Cast iron borings	*11.00-12.00*
Machine shop turnings	*20.00-21.00*
Shovel turnings	*21.00-22.00*
Bar crops and plate	40.00-41.00
Structurals & plate	39.00-40.00
Electric furnace bundles	35.00-36.00
Electric furnace:	
3 ft and under	33.00-34.00
2 ft and under	34.00-35.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	50.00-51.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
Rails, 18 in. and under	*46.00-47.00*
Rails, random lengths	*42.00-43.00*
Angles, splice bars	*41.00-42.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00†
No. 2 heavy melting	28.00†
No. 1 bundles	33.00†
No. 2 bundles	19.00†
No. 1 busheling	33.00†
Machine shop turnings	13.00†
Shovel turnings	15.00†

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	37.00†
Heavy breakable cast	35.00†
Unstripped motor blocks	35.00†
Clean auto cast	47.00
Stove plate	39.00†

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†
Rails, random lengths	*40.00†*
Rails, rerolling	*50.00†*
Rails, 18 in. and under	*43.00†*
Angles, splice bars	*41.00†*

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 2 bundles	19.00
Machine shop turnings	13.00-13.50
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	27.00†
Foundry malleable	31.00†
Unstripped motor blocks	31.00-32.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00†

LOS ANGELES

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	33.00
No. 2 bundles	17.00
Machine shop turnings	16.00
Shovel turnings	16.00
Cast iron borings	16.00
Cut structurals and plate 1 ft and under	43.00

Cast Iron Grades

No. 1 cupola	40.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	35.00
No. 2 heavy melting	32.00
No. 1 bundles	29.00
No. 2 bundles	19.00
Shovel turnings	16.00
Electric furnace bundles	43.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable	26.00
Unstripped motor blocks	24.00
Stove plate	21.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	*33.00*
No. 2 heavy melting	*30.00*
No. 2 bundles	*23.00*
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Electric furnace No. 1	42.00

Cast Iron Grades

No. 1 cupola	30.00
Heavy breakable cast	25.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	20.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades‡

No. 1 machinery cast	46.50-48.00

†Nominal.
‡F.o.b. Hamilton, Ont.

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Molybdenum Outlook Good

This could be the best peacetime year for the metal as new uses pick up. April copper figures bullish, but market may be due to slide. Silver output up

Nonferrous Metal Prices, Pages 198 & 199

A NEW HIGH for civilian usage of molybdenum may be set this year. Encouraged by a hefty first quarter, industry spokesmen cautiously predict 1960 production and sales will run at a near record, if not a record, rate for any peacetime year.

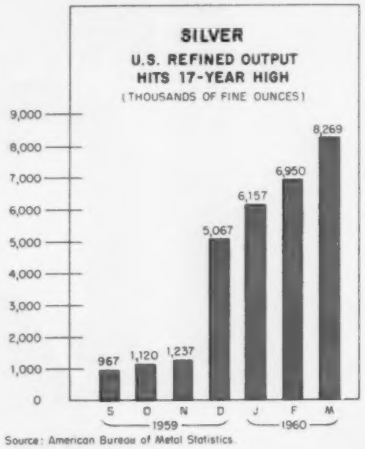
• **Output Up**—The latest official figures show that combined January-February U. S. production hit 10,023,000 lb compared with 9,587,000 lb in the same period of 1959. First quarter sales were well above those of the like period of last year.

The high level activity of the first quarter was due in part to the cessation of strikes in copper and steel. The copper strikes cut sharply into stocks of molybdenum since about one-third of our supply comes as a byproduct of copper refining. As more molybdenum became available this year, users in this country and overseas (where demand has been exceptionally strong) moved quickly to build up inventory. At the same time, resumption of steel production and the heavy operating rate that extended through the first quarter, brought a spurt in demand from makers of low alloy, stainless, and tool steels.

Demand has slumped a little in the last few weeks but not enough to dim the industry's optimistic outlook for 1960.

• **Shift in Emphasis** — In recent years, the industry has concentrated on the defense market as an outlet for molybdenum metal. Producers, now aware that rapidly changing defense systems make for fickle business, are turning more to the civilian market. They are backed by a wealth of technological knowledge.

They think they have a good story to tell. For instance, five years ago molybdenum metal couldn't be produced in the sizes and shapes demanded by many metalworking companies. Today, the industry says it can meet those requirements, thanks to new facilities and processes that grew out of production of missile parts and other Space Age military components.



Source: American Bureau of Metal Statistics

• **Sales Pitch**—Producers point to molybdenum's corrosion resistance, machinability, heat resistance, high strength at high temperatures, thermal shock resistance, high thermal conductivity, and good electrical conductivity (about one-third that of copper). They say those properties, plus good availability of needed shapes and sizes, have opened up such new and potential markets as:

- Pumps for molten zinc.
- Electrodes for glassmaking.
- Piercer points for steelmaking operations.
- Cores for aluminum and copper diecastings.
- Diecasting dies.
- Extrusion dies for steel.
- Boring bars.

Silver Output Way Up

In March, U. S. silver production rocketed to 8,269,000 ounces, the highest in 17 years (see chart). But it's unlikely that we'll see a repeat performance. March figures reflect the making up of production lost during strikes in the latter part of 1959 and early this year.

Copper Shipments Gain

If copper sales are losing momentum, the fact certainly didn't show up in the April statistics released last week by the Copper Institute. Deliveries to fabricators rose for the fifth straight month as they hit 129,663 tons. At the same time, crude production was at an all-time high of 118,850 tons. Refined production jumped to 153,053 tons, probably due in part to the startup after a long labor shutdown of Phelps Dodge Corp.'s Laurel Hill (N. Y.) refinery.

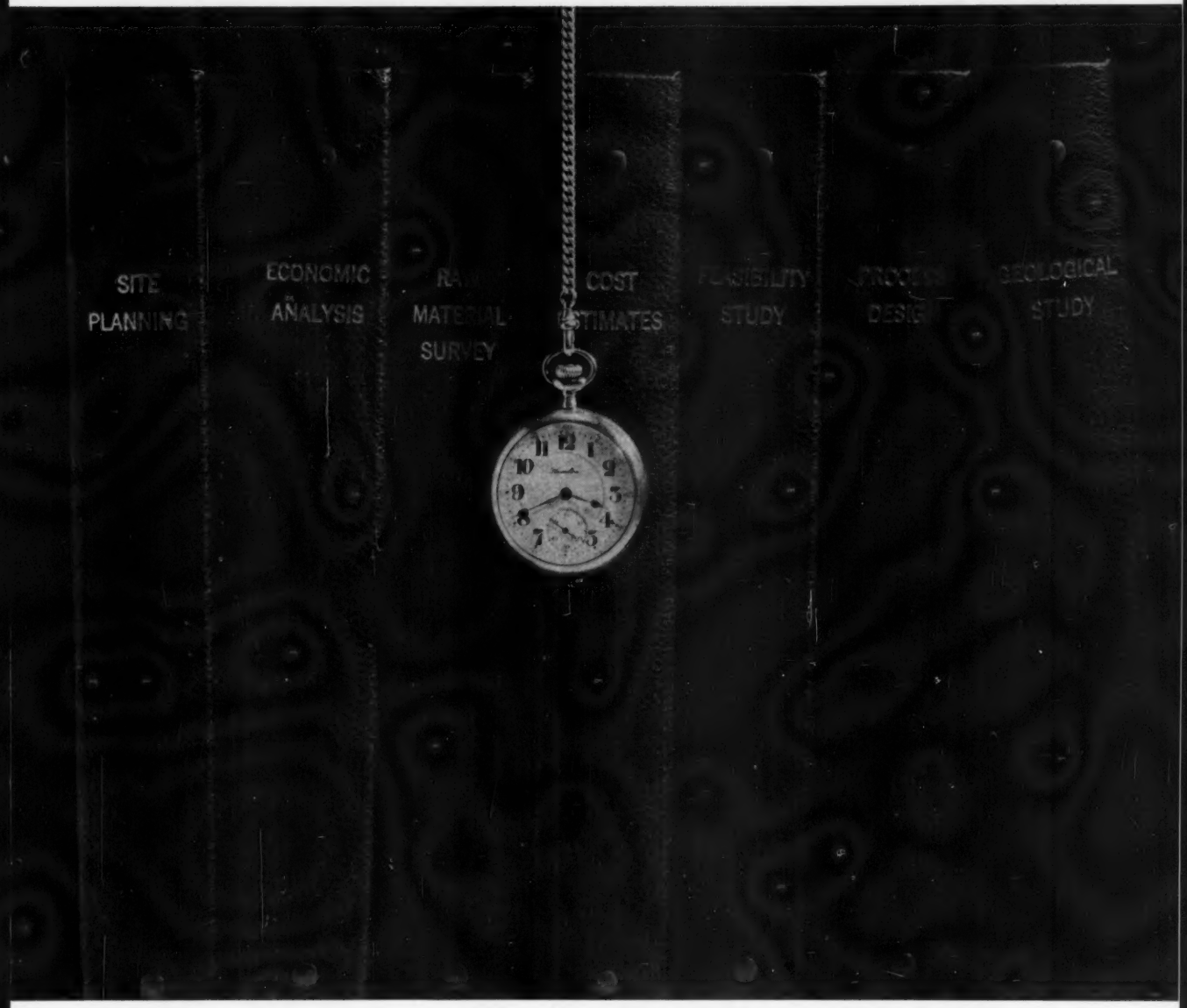
Nevertheless, there are signs that the copper picture might not be as bright as the statistics paint. New orders don't seem to be keeping up the pace.

NONFERROUS PRICE RECORD

	May 18 Price	Last Change	Previous Price	Apr. Avg	Mar. Avg	May, 1959 Avg
Aluminum	26.00	Dec 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00–35.00	33.000	33.296	31.750
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	11.700
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	99.875	May 18, 1960	99.625	99.260	100.227	103.080
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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6228-S

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.60; No. 43, 25.90; No. 195, 30.70; No. 214, 31.50; No. 356, 26.30, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $213-215 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 99.875.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.50; special high grade, 14.75 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 25.50-26.50; 13 alloy, 0.60 Cu max., 25.50-25.75; 195 alloy, 27.75-28.75; 108 alloy, 25.25-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam.	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.80-87.40
12-14	65.30-67.60	85.70-88.60
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.50-24.00; No. 2 heavy copper and wire, 20.75-21.25; light copper, 18.75-19.25; No. 1 composition red brass, 17.25-17.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 30.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.75-16.25; new brass clippings, 14.50-15.00; light brass, 11.00-11.50; heavy yellow brass, 12.00-12.50; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 13.00-13.50; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 27.00-28.00; old sheets, 23.00-24.00; turnings, 20.00-22.00; rods, 27.00-28.00.

Nickel: Sheets and clips, 53.00-54.00; rolled anodes, 53.00-54.00; turnings, 41.00-42.00; rod ends, 53.00-54.00.

Zinc: Old zinc, 4.00-4.50; new diecast scrap, 4.00-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 7.25-7.50; segregated low copper clips, 14.50-15.00; segregated high copper clips, 12.50-13.00; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.50-16.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 14.00-14.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.25-11.75; clean borings and turnings, 10.00-10.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.25; light copper, 22.00; refinery brass (60% copper) dry copper content, 22.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 24.25; light copper, 22.00; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.25; yellow brass turnings, 14.00; radiators, 16.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 193*)

• **Birmingham**—With steel mill and foundry operations far below normal, demand for scrap is light. Cast iron pipe companies are the principal buyers. Cast is moving in fair quantities, but open hearth and electric furnace consumers are out of the market after making limited purchases which are still being received. Brokers have cut prices on some items and continue to list them as nominal. A railroad list closed last week and went principally to exporters.

• **Houston** — Activity is depressed. Poor mill demand is being offset by dwindling over-the-scale traffic. The Houston mill has contracted for a tonnage of Prolerized steel, a specially prepared Houston grade, and has indicated that it will limit additional purchases for June delivery to below-normal tonnages of No. 2 heavy melting steel. The mill plans no formal purchases during May. Brokers are still working on a limited April order which they were unable to fill by the Apr. 30 deadline. The mill allowed this order to extend through May. Country scrap intake is depressed due to low dealer prices. Hundreds of individual haulers have switched to agricultural work.

• **San Francisco**—Mill buying of steel scrap is negligible. One big user is operating only two of five open hearths, and other mills in the area are down correspondingly.

• **Seattle**—There is a slightly firmer tone to the scrap market, due in some measure to increased export interest. Prices have advanced $1 on No. 1 and No. 2 heavy melting (to $33 and $30) and on No. 2 bundles to $23. Domestic buyers are not active, and receipts are not heavy.

Iron Ore . . .

Iron Ore Prices, Page 190

The Great Lakes iron ore fleet has 235 vessels this season. Total trip capacity is 2,925,835 gross tons. Vessels average 12,450 gross tons. A year ago, the fleet included 246 ships, with a trip capacity of 2,993,835 gross tons. Company fleets number 24 this year. They are:

Great Lakes Iron Ore Fleets

Company	No. of Vessels	Trip Capacity Gross Tons
Pittsburgh Steamship	57	764,100
Interlake Steamship	31	409,800
Wilson Marine Transit	16	190,000
Cleveland-Cliffs Iron	14	173,125
Pioneer Steamship	13	138,450
Bethlehem Transportation	12	177,100
M. A. Hanna	10	154,100
Columbia Transportation	9	129,000
Republic Steel	9	107,700
Reiss Steamship	7	74,100
Tomlinson Fleet	7	72,600
Kinsman Transit	6	60,100
Buckeye Steamship	6	55,300
Inland Steel	5	73,800
Gartland Steamship	5	43,350
Midland Steamship	4	42,050
Browning Lines Inc.	4	39,950
Boland & Cornelius	4	38,400
T. J. McCarthy Steamship	4	29,600
Shenango Furnace	3	54,400
Ford Motor	3	46,600
International Harvester	2	23,000
Brown & Co.	2	15,000
Jupiter Steamship	2	14,210
Total	235	2,925,835

Last year the fleet moved 51,450,731 gross tons of iron ore vs. 54,798,230 in the preceding year. The record: 95,844,449 tons in 1953.

CLASSIFIED

Help Wanted

Detailer-Layout Man

Draftsman with detailing and layout experience. Age 20 to 45. To grow and progress with sheet steel and steel plate fabricating plant, currently employing 300 to 350 people.

Must be able to develop patterns and layouts in all types of industrial sheet metal fabrications with range of #24 gauge to ½" thick.

State age, education, experience and starting salary expected.

The Kirk & Blum Mfg. Co.
3120 Forrer St.
Cincinnati 9, Ohio

Help Wanted

SALES ENGINEER—One of our progressive expanding divisions has an excellent opening in the Chicago area for a man qualified to sell clamshell buckets and grapples. This division manufacturers an extensive line of buckets and grapples for the steel industry, industrial and contracting business. Qualifications: Prefer M.E. degree with sales experience along these lines. Craneway, crawler, overhead and locomotive type crane experience will be given consideration. Compensation: Salary — plus expenses — plus fringe benefits to include insurance, pension, savings and vacation. Send complete qualifications and salary desired to Blaw-Knox Company, 300 Sixth Avenue, Pittsburgh 22, Pa. J. J. Zimmerman.

Positions Wanted

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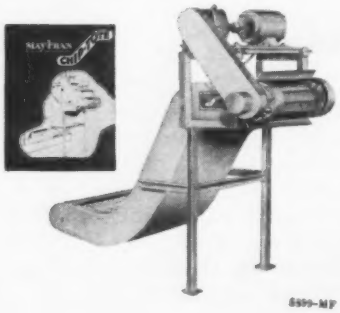

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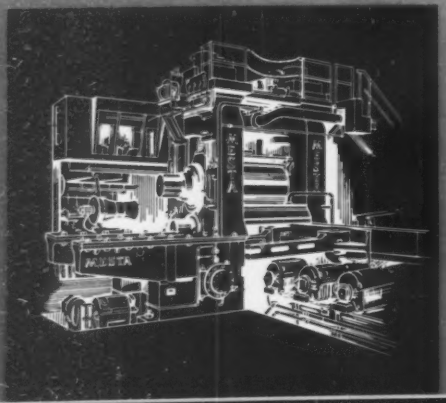

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